U. S. Department of Energy

Implementation Plan
to Improve Oversight of Nuclear Operations

(in response to Defense Nuclear Facilities Safety Board Recommendation 2004-1)

Revision 1

Washington, D.C. 20585

June 2005

Executive Summary

The Defense Nuclear Facilities Safety Board (Board) issued its Recommendation 2004-1, *Oversight of Complex, High-Hazard Nuclear Operations*, on May 21, 2004. In its recommendation, the Board noted concerns regarding a number of safety issues, including delegations of authority for fulfilling safety responsibilities, federal technical capability, Central Technical Authorities, nuclear safety research, lessons learned from significant external events, and integrated safety management. The Board has provided additional information and expectations regarding this recommendation as follows:

- Board Technical Report DNFSB/TECH-35, *Safety Management of Complex, High-Hazard Organizations*, transmitted to the Department on December 12, 2004.
- Board letter, dated February 14, 2005, providing feedback and additional expectations.
- Board member presentation, dated March 16, 2005, providing input on Central Technical Authorities and nuclear safety research.

The Department of Energy (DOE or Department) is revising its implementation plan based on this additional information, and to reflect actions completed. This implementation plan defines the actions that the Department will take in response to this recommendation. These actions fit into three broad areas:

- Strengthening Federal Safety Assurance
- Learning from Internal and External Operating Experience
- Revitalizing Integrated Safety Management (ISM) Implementation

To resolve the identified issues within these areas, the Department has established a number of end-state commitments, described in this plan, including the following:

- Two Central Technical Authorities (CTAs) with adequate technical support.
- Effective Implementation of Clarified DOE Oversight Model.
- Nuclear safety research function.
- Strengthened technical qualification of Federal safety assurance personnel.
- Formal safety delegation and assignment process.
- DOE Operating Experience Program, an element of the ISM "feedback and improvement" function.
- Clear expectations for ISM implementation for Federal organizations.
- Enhanced field focus on work planning and work control.
- Improved implementation of the ISM "feedback and improvement" function.

For each commitment, the Department has identified the set of intermediate milestones necessary to achieve the end-state commitments, as well as the verification activities to ensure that actions taken are effective to resolve the original issues. Overall execution of this Implementation Plan is the responsibility of the 2004-1 responsible manager.

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1.0 INTRODUCTION

The purpose of this plan is to define the Department's path forward in three areas critical for the continuance of the Department's strong record in protecting the health and safety of the public and the Department's workers. The three focus areas or themes of this plan are as follows:

- **Strengthening Federal Safety Assurance** – the structure, practices, and methods by which the Department's federal technical personnel ensure safety by defining clear safety expectations, monitoring performance, and obtaining effective implementation and continuous improvement.

- **Learning from Internal and External Operating Experience** – the practices by which the Department and its contractors learn from their own operating experience as well as that from others, particularly from the recent NASA Columbia accident and from the Davis-Besse nuclear plant vessel head corrosion incident.

- **Revitalizing Integrated Safety Management Implementation** – a set of actions the Department will pursue to re-confirm that ISM will be the foundation of the Department's safety management approach and to address identified weaknesses in implementation.

2.0 BACKGROUND

The Board issued its Recommendation 2004-1 on May 21, 2004 (Appendix D). The Department of Energy (DOE or Department) accepted the Board's recommendation on July 21, 2004 (Appendix E). The Department provided its initial implementation plan on December 23, 2004. Based on subsequent information, the Department developed this version of the implementation plan.

In its Recommendation 2004-1, the Board identified several specific concerns related to changes or proposed changes being made by the Department. Contemplated or proposed modifications to DOE's, including the National Nuclear Security Administration's (NNSA's), organizational structure, staffing, contract management, oversight policies and practices, and safety directives were cited as potential sources of unintended safety consequences.

3.0 UNDERLYING CAUSES

The Department has fully evaluated the Board recommendation and assessed the underlying causes that led to these concerns. The Department's evaluation activities included the following:

- Reviewing recent changes in the Department as well as related historical lessons
- Studying NNSA's Columbia Accident Investigation Board (CAIB) Lessons Learned Team report for applicability across the Department
- Evaluating trends from occurrences, events, and internal and external reviews related to safety management
- Researching High Reliability Organization (HRO) literature with emphasis on attributes deemed essential to preventing organizational accidents
- Benchmarking other industries (e.g., aviation, commercial nuclear power, and naval reactors).

From this effort, the Department has identified the following underlying causes and mapped them to three main areas addressed in this plan: federal safety assurance, learning from operating experience, and ISM.

Federal Safety Assurance

- Lack of centralized technical expertise and operational awareness concerning implementation of nuclear safety policy and requirements
- Overall decline in strength of Headquarters line oversight
- Lack of a strong central focus on nuclear safety research and development
- Delegations of authority not consistently made with clear expectations
- Decline in the Department's technical capability and capacity

Learning from Operating Experience

- Inconsistent use of operating experience (both internal and external such as Columbia accident and the Davis-Besse reactor vessel corrosion incident)
- Lack of quality improvement programs to identify and take preventive or corrective actions.

Integrated Safety Management

- Continued inconsistencies in ISM implementation. Lack of rigor in work planning and control, and repeat failures and issues (indicating problems with feedback and improvement) are common causes identified from events and internal and external reviews. The Department needs to improve implementation in these areas.

- Lack of attention and commitment to developing the attributes recognized in HROs. Specifically, emphasis is required to promote technical excellence, encourage a questioning attitude, avoid normalization of deviations, and ensure that organizational learning is a key value.

4.0 BASELINE ASSUMPTIONS

The Department makes the following baseline assumptions regarding successful fulfillment of the 2004-1 Implementation Plan, as developed:

- This plan assumes a continuity of supportive leadership commitment and active engagement of the Department's senior leaders.

- This plan is based on continued Department commitment to, and support of, the Department's ISM and QA Programs. Integrated quality and safety management systems are considered to be a solid foundation upon which to build further improvements to the Department's safety management behaviors, performance, and culture. Building from this strong existing base is expected to make the actions under this plan more achievable and more acceptable throughout the Department.

- Implementation plan execution is based on target-level funding approved by Congress in an atmosphere of stable mission requirements. Initial funding can be accommodated from existing budgets. The Department will vigorously pursue necessary funding for steady-state activities.

- Actions identified in this plan are intended to address concerns identified in Board Recommendation 2004-1. The Department may take additional actions outside of this plan to address other issues.

- This plan does not commit to any changes to DEAR clauses or directives, except to the extent specifically described in the plan.

- This plan describes Department actions for nuclear facilities. For the purposes of interacting with the Board on this implementation plan, however, the deliverables are limited to those facilities within the Board's scope (i.e., defense nuclear facilities). The Department will consider the level of hazard involved in tailoring implementation, and focus the most attention on preventing potential accidents related to high hazard, nuclear operations.

- Line management has primary responsibility for safety and the implementation of safety policy and requirements. CTAs ensure the availability of technical expertise and operational awareness necessary for adequate and proper implementation of the Department's safety programs by line management. OA remains responsible for performing independent oversight. EH-1 is the corporate officer responsible for making Environment, Safety and Health policy and providing technical interpretation of it.

5.0 SAFETY ISSUE RESOLUTION

This section is organized around the following three main areas:

- Strengthening Federal Safety Assurance
- Learning from Internal and External Operating Experience
- Revitalizing ISM Implementation

Within each of the above main areas, supporting discussion addresses specific issues, bases for the issues, resolution approaches, and commitments/deliverables/milestones to resolve the issues.

5.1 Strengthening Federal Safety Assurance

Central to the needed improvement in federal safety assurance are:

- Instituting Central Technical Authorities;
- Providing Effective Federal Oversight;
- Instituting a Nuclear Safety Research Program;
- Establishing Clear Roles, Responsibilities, and Authorities;
- Ensuring Technical Capability and Capacity to Fulfill Safety Responsibilities.

5.1.1 Instituting Central Technical Authorities

Issue

The Department needs centralized technical expertise and operational awareness to assure adequate and proper implementation of Departmental nuclear safety policy and requirements.

Basis

The Department needs to improve the availability of technical expertise and operational awareness concerning implementation of its set of nuclear safety policies, requirements and standards. Currently the lack of qualified personnel and the lack of consistent adherence to existing practices for exemptions and waivers to nuclear safety requirements have led to variability in implementation. Additionally, line oversight of implementation is not consistently performed across the DOE Complex. Finally, the Department's line organizations have not systematically and consistently evaluated their nuclear safety performance to determine whether approved sets of requirements and standards are properly understood, applied and implemented.

Resolution Approach

Roles and Responsibilities. DOE needs to ensure that core nuclear safety expectations are fulfilled. More consistent evaluations of the flow-down of key nuclear safety requirements to contractors are needed to ensure that these requirements are adhered to and implemented adequately and properly,

and that nuclear safety performance meets or exceeds safety expectations. To promote achievement of these objectives, the Department established two Central Technical Authorities (CTAs), one in the NNSA and one in ESE. The CTA for NNSA is the Principal Deputy Administrator (or other line official designated by the Administrator), and the CTA for ESE is the Under Secretary.

The CTAs are line management executives who will be responsible for the following core nuclear safety functions for their organizations and facilities:

(1) concurs with the determination of the applicability of DOE Directives involving nuclear safety included in contracts pursuant to DEAR 970.5204-2(b);

(2) concurs with nuclear safety requirements included in contracts pursuant to DEAR 970.5204-2(c);

(3) concurs with all exemptions to nuclear safety requirements in contracts that were added to the contract pursuant to DEAR 970.5204-2;

(4) recommends to the Assistant Secretary for Environment, Safety and Health (EH) issues and proposed resolutions concerning DOE safety requirements, concurs in the adoption or revision of nuclear safety requirements (including supplemental requirements), and provides expectations and guidance for implementing nuclear safety requirements as necessary for use by DOE employees and contractors;

(5) maintains operational awareness of the implementation of nuclear safety requirements and guidance, consistent with the principles of Integrated Safety Management across the DOE complex (including, for example, reviewing Documented Safety Analyses, Authorization Agreements and readiness reviews as necessary to evaluate the adequacy of safety controls and implementation);

(6) periodically reviews and assesses whether DOE is maintaining adequate numbers of technically competent personnel necessary to fulfill nuclear safety responsibilities; and,

(7) provides inputs to, reviews, and concurs with DOE-wide nuclear safety related research and development activities proposed by the Assistant Secretary for Environment, Safety and Health.

Due to their positions as line management executives, the CTAs have the requisite authority to fulfill their roles and responsibilities. As line managers, the CTAs expect compliance with their direction from their subordinates. The NNSA Site Office Managers, the NNSA Program Secretarial Offices (PSOs), and the Chief of Defense Nuclear Safety (CDNS) all report directly to the Principal Deputy Administrator, so he is well positioned to fulfill his responsibilities. The ESE Program Secretarial Officers report directly to the Under Secretary and the Field Element Managers report to the Under Secretary through the PSOs. The Chief of ESE Nuclear Safety (CENS) and staff report to the ESE CTA. Therefore, the ESE CTA is also well positioned to fulfill his responsibilities.

The Assistant Secretary for Environment, Safety and Health (EH) plays an important role in ensuring the safety of DOE activities, but EH is not a CTA. EH is a staff position and does not have line responsibilities for operational or nuclear safety goals. EH is the DOE corporate safety officer and therefore is responsible for developing nuclear safety rules and is the Office of Primary Interest (OPI) for many DOE Directives that involve nuclear safety. DOE rules are established in accordance with the Administrative Procedures Act and DOE Directives are established in accordance with DOE Policy 251.1, Directives System Policy.

Support Staff. The NNSA Chief of Defense Nuclear Safety (CDNS) and staff are supporting the Principal Deputy Administrator in carrying out the functions of the CTA, including maintaining awareness of complex, high-hazard nuclear operations conducted in the NNSA nuclear complex, through such activities as: monitoring of applicable reports and performance metrics; reviewing various site-specific and complex-wide documents; technical discussions; and site visits.

The Under Secretary will be supported by the Chief of ESE Nuclear Safety (CENS) and his staff of dedicated technical experts. These staff will support the Under Secretary in carrying out the functions of the CTA, including maintaining awareness of complex, high-hazard nuclear operations conducted in the ESE nuclear complex, through such activities as: monitoring of applicable reports and performance metrics; reviewing various site-specific and complex-wide documents; technical discussions; and site visits. These CTA support staff will report to the Under Secretary and receive administrative support from EH. EH will have no supervisory role relative to the CTA staff. This reporting relationship is a change from the previous Department approach and is intended to clearly differentiate between the line safety functions of the CTA and the corporate safety functions of EH.

Preliminary estimates for the number of technical experts supporting the CTAs are in the range of 18-25 for the Department as a whole; the required support staffing level will be evaluated and set based on a detailed staffing analysis. The Department's objective is for the supporting technical experts to maintain exceptional technical capability with institutional constancy, and, therefore, their advice, counsel, and guidance would be readily sought from both headquarters and field offices on nuclear safety matters. Over time, the technical expertise of the supporting personnel would be easily recognizable and well-appreciated in both headquarters and the field.

The CTAs and supporting technical experts will work closely with federal line managers and, as necessary, coach and mentor on techniques, tools, and skills to improve and upgrade the quality of the Department's technical safety management capability. The CTAs and supporting technical experts will also maintain an operational awareness of field activities, to include safety basis implementation, nuclear start-ups and restarts, personnel training and qualifications, maintenance, criticality safety, conduct of operations, and radiation protection. The CTAs and supporting technical experts will maintain awareness of production decisions and assure that the desire to meet programmatic commitments is properly balanced with safety. The operational awareness role of the CTAs is not intended to duplicate the independent oversight function.

The CTAs have already begun to allocate positions and search for candidates for the key nuclear safety staff experts. The Department is moving ahead in its hiring efforts and is taking steps to sustain adequate staff resources over the long run.

Customer, Owner, and Regulator. The Department's plan for the CTAs assigns the function to line management executives. These positions share customer and owner responsibilities with the PSOs and field elements yet are above the day-to-day operational decision-making level and therefore maintain unto themselves the self-governor perspective.

As indicated previously, EH is the corporate safety officer within DOE. EH is tasked with developing nuclear safety rules in accordance with the Administrative Procedures Act. These rules are developed by groups of experts including representatives from the line organizations. All interested parties, including the CTAs, have an input. EH is also the OPI for many DOE nuclear safety directives. Like rules, directives are developed by teams of experts including personnel from the line organizations and all affected parties have the right and the expectation to provide inputs.

Nuclear safety expectations in directives may only become requirements for contractors when they are added to the contract. This is a line function. Authority to determine the nuclear safety requirements in List B of DOE contracts has been delegated to Contracting Officers. The CTAs are line managers senior to the Contracting Officers. The CTAs' authorities include concurring with the nuclear safety requirements in List B of contracts and concurring with exemptions granted to nuclear safety requirements. The CTAs also have the function to provide operational awareness and ensure that nuclear safety requirements are appropriately and consistently implemented. Therefore, the CTAs actively fill the self-governor roles of establishing requirements, ensuring that they are appropriately promulgated (including exemptions), and verifying that they are implemented.

Implementation and Institutionalization. To fully implement the CTA role, the Department plans to:

- Define the detailed functions, responsibilities and authorities for the CTAs.
- Update the Department Functions, Responsibilities, and Authorities Manual (FRAM) and Program office Functions, Responsibilities, and Authorities (FRA) documents to reflect the CTAs' functions, responsibilities, and authorities.
- Complete a staffing analysis for technical experts necessary to support CTAs.
- Fill the positions for supporting technical experts.
- Define technical qualifications of the CTA and of the CTA support staff, including the NNSA CDNS, and the ESE CENS. Where technical qualifications are not met, corrective or compensatory actions will be taken.
- Define the processes and protocols for fulfilling the CTA roles and responsibilities. For example, the specifics on how and when the CTAs must be involved in the process for granting exemptions to nuclear safety rules and orders needs to be finalized, considering existing processes that require approval of the program line managers and the OPI.
- Describe how the CTAs will interface with other organizations (for example, Office of Enforcement, field elements, and program offices). For example, the 2 CTAs and EH-1 will need to meet periodically to coordinate activities.

- Establish an operating budget for fulfilling CTA duties.

In establishing and bringing the CTAs to a full implementation status, the Department has identified the following three key milestones:

1. The CTAs are formally established – the CTAs are formally designated, and the CTA roles and responsibilities have been defined – The Secretary approved the roles and responsibilities in April 2005.

2. The CTAs have adequate technical support – key critical staff positions that support the CTAs have been defined and are filled on a permanent or temporary basis.

3. The CTA function is fully implemented – CTAs are supported by sufficient resources (personnel, funding, etc.), have processes defined on how they will implement their functions, have a demonstrated record of performance, and feedback is available on the impact of the CTA function.

The Department will keep the Board informed on the progress of the CTA implementation and institutionalization via periodic meetings with the Board on this Implementation Plan, as described in Section 6.

Deliverables/Milestones

Commitment 1: Formally establish the CTAs (as described above).

Lead Responsibility:	Secretary of Energy
Deliverable:	Secretarial memo identifying the CTAs and their roles and responsibilities.
Date:	**Completed - April 26, 2005**

Commitment 2: Provide Adequate Technical Support for the CTAs (as described above).

Lead Responsibility:	Central Technical Authorities
Deliverable:	Letter report from each of two CTAs to the Secretary declaring the CTA has adequate technical support and providing the basis for this declaration.
Date:	January 2006 (NNSA); April 2006 (ESE)

Commitment 3: Fully Implement the CTA function (as described above).

Lead Responsibility:	Central Technical Authorities
Deliverable:	Letter report from each of two CTAs to the Secretary declaring the CTA function fully implemented and providing the basis for this declaration (NNSA report requires NNSA Administrator's concurrence).
Date:	Twelve months after providing adequate technical support to the CTAs, per Commitment 2. [January/April 2007]

Integration with ISM system

Establishment of effective CTAs relate mostly to two ISM core functions: #1 – Define Work Scope, and #5 - Feedback and Improvement. The CTA is involved in defining the appropriate set of requirements and standards in contracts to be applied to hazards to define hazard controls. The CTA is also involved in providing oversight and feedback throughout the organization.

Regarding the ISM guiding principles, which establish the general environment or context for implementing the ISM functions, most of the ISM principles are invoked. ISM Guiding Principle #1 – Line Management Responsibility for Safety – led to the decisions that the CTAs needed to be line management executives. ISM Guiding Principle #2 – Clear Roles and Responsibilities – led to clear articulation of the CTAs' roles and responsibilities and the commitment to update the DOE FRAM. ISM Guiding Principle #3 – Competence Commensurate with Responsibilities – led to need to attract a high quality technical staff to support this function, and the need to articulate the technical qualifications of the CTA and key staff. ISM Guiding Principle #4 – Balanced Priorities – recognizes the need for appropriate checks and balances to ensure safety is not sacrificed for productivity; one of the key arguments for establishing the CTAs is to provide perspective and distance from the work in the field along with an effective regulatory and oversight check to program offices which may be more drawn to the owner and customer roles. ISM Guiding Principle #5 – Identification of Safety Standards and Requirements is at the center of the CTA's responsibilities for establishing an effective set of safety requirements and for proper application of this set to contracts to design, construct, manage, operate, and decommission defense nuclear facilities.

5.1.2 Providing Effective Federal Oversight

Issue

The Department must provide effective federal safety oversight to ensure it fulfills safety responsibilities at all levels of the Department.

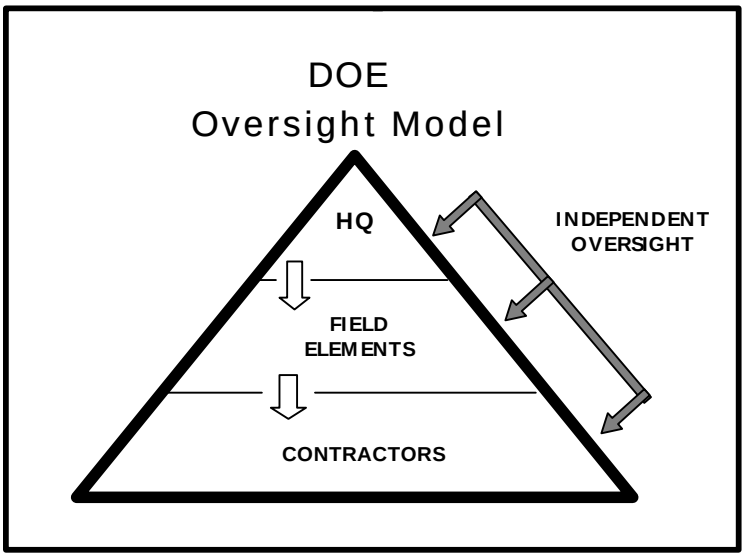
Basis

DOE officials may delegate safety authorities. These delegations do not relieve the delegating officials of their responsibilities for safety. Fulfilling the original safety responsibilities demands that delegations of authority and delegated work must be reviewed to ensure that it is being done consistent with expectations. In recent years, the consistency and rigor of the Department's line management oversight processes have declined. The Department's Oversight Policy, P 450.5, has not been fully implemented throughout the DOE organization. In particular, line oversight by DOE program offices at headquarters has not been well defined and implemented to ensure that field office safety functions are being effectively performed. As a general principle, multiple levels of oversight provide a degree of redundancy that is necessary for safety in highly complex, high-hazard operations.

Resolution Approach

The Department's oversight model is based on four tiers:

- Contractors
- DOE field elements
- DOE Headquarters line management organizations
- Independent Oversight



Headquarters line management oversight is focused on the DOE field elements and also looks at contractor activities to evaluate the implementation of HQ expectations and the effectiveness of field element line management oversight. Field element oversight is focused on Contractors. Independent oversight looks at all levels. Self-assessments are done at each level. The CTAs will maintain awareness of operational activities and conditions that affect nuclear safety and, as executives within the line

management chain, will work to continually strengthen and improve the line management's safety oversight capability and performance. This awareness will be maintained through such activities as monitoring applicable reports and performance metrics, reviewing various site-specific and complex-wide documents, technical discussions, and occasional site visits.

Key principles for effective oversight include:

- DOE Line oversight programs include operational awareness by the facility representatives and safety system oversight personnel, periodic safety oversight assessments, for-cause reviews, self-assessments, and monitoring and evaluation of operational occurrences, performance measures, and other operational data and information.
- Oversight programs should clearly define areas for periodic safety oversight assessments.
- Periodic safety oversight assessments should be performed using Criteria and Review Approach Documents (CRADs) based on clearly defined performance objectives, derived from DOE directives, standards, and expectations.
- Oversight should be performed by personnel who have demonstrated technical capability in both technical areas and oversight methods.
- A base level of oversight and minimum periodicity should be defined for each oversight review area; oversight can increase with poor performance, but cannot reduce below the base level and minimum periodicity.
- Oversight programs should consider the level of hazard involved, and provide increased focus and attention on high-hazard, nuclear operations.
- Redundancy in oversight is necessary and appropriate for operations that can result in high-consequence accidents.
- Oversight findings should be reviewed for accuracy, addressed by corrective action plans, tracked to completion, and verified to be effectively resolved.

Independent Oversight is performed by DOE organizations that do not have line management responsibility for the activities being reviewed. Independent oversight performance evaluations provide an independent perspective on the effectiveness of DOE line management and contractors in ensuring that HQ and site operations are performed safely, securely, and in compliance with applicable requirements. OA performs most of the Department's independent safety oversight reviews under the direct authority of the Office of the Secretary of Energy with results provided to DOE line management and other interested parties.

DOE Policy 226.1, "DOE Oversight," has been developed and is expected to be approved for use in June 2005. It identifies terminology, general policy, and attributes of effective oversight. The Policy 226.1 is consistent with this Implementation Plan, Revision 1, and no immediate changes to this Policy are needed. The Department expects to revisit the Policy after two to three years of implementation experience to make any beneficial clarifications, expansions, or other changes.

The Department is in the process of responding to comments to draft DOE Order 226.1, "Implementation of DOE Oversight Policy," to ensure that program office comments are properly incorporated. These directives will provide the foundation for oversight of a broad range of activities including environment, safety, and health; safeguards and security; cyber security;

emergency management; and other disciplines. They are being developed and will be maintained in accordance with the Department's directive process, which allows all programs to provide review and concurrence. Many programs will be involved in developing this directive: (1) EH will have primary responsibility for safety policy; (2) the Chief Information Officer will be responsible for cyber security policy, (3) the Office of Security and Safety Performance Assurance will be responsible for safeguards and security policy, and (4) NNSA will be responsible for emergency management policy. Due to the number of offices involved, OA-1 will serve as the Office of Primary Interest for these directives.

With publication of the new DOE Order on Oversight, the previous DOE Line Management Oversight Policy 450.5 will be cancelled. This is based on the results of a cross-walk that showed where the critical elements of DOE Policy 450.5 would be continued in DOE Policy and Order 226.

Additional requirements for safety oversight are being developed as part of the 2004-1 implementation plan. The Department will develop a new DOE Safety Oversight Manual to provide expectations for conducting periodic oversight assessments of nuclear operations. If no additional requirements are needed beyond those contained in DOE Order 226, the Department will consider making the Safety Oversight Manual into a handbook. The Manual will formalize oversight expectations and will include the following:

- Establish the set of review areas for conducting periodic safety oversight assessments
- Define the purpose, scope, and requirements for each review area
- Establish the expectations for developing a safety oversight assessment plan that defines the following
  - Minimum review periodicity for a core set of review areas and a process for increasing the review frequency based on safety performance
  - Guidelines for selecting additional discretionary review areas to be included in the safety oversight assessment plan such as availability and results of previous assessment information
  - Expectations for planning, conducting, and documenting periodic assessments including the requirement to use a CRAD for conducting each scheduled assessment
  - Expectations for categorizing assessment findings, developing and tracking corrective actions to closure, and verifying effectiveness of finding resolutions
  - Expectations for periodically updating and revising the safety oversight assessment plan based on site specific performance trends or external significant operational experience information
- Establish expectations for ensuring an integrated approach to oversight including the evaluation of the effectiveness of ISM during each review area assessment and a balanced emphasis on performance and compliance
- Establish expectations for developing and executing a Headquarters review/interface process
- Establish performance metrics for measuring the effectiveness of periodic oversight assessments, such as resolution of oversight findings.

The Safety Oversight Manual will include an appendix of standard CRADs for the core set of review areas. These standard CRADs are for use by DOE Headquarters and field elements to provide for consistent implementation and effectiveness of periodic safety oversight assessments. These CRADs are intended to be tailored as appropriate based on the specific scope of the review,

the applicability to the site/office, and any specific contractual requirements. The CRAD for a specific review area will include:

- Performance objective, acceptance criteria, and approach for assuring that the program requirements have been accurately translated into a program description document and/or procedures;
- Performance objective, acceptance criteria, and approach for assuring that the program implementation is consistent with expectations laid out in the program description documents; and
- Performance objective, acceptance criteria, and approach for assuring that DOE site and headquarters elements are providing adequate oversight.

Each individual performance objective will include acceptance criteria for evaluating the effectiveness of the applicable ISM guiding principles for the review area. This will help ensure that the assessment results include an evaluation of the effectiveness of the integration of various programs within the applicable contractor or DOE ISM systems description.

The Department began development of the CRADs by reviewing and evaluating various historical methods for establishing a complete list of safety oversight review areas, such as Board Technical Report 5, the Safety/Requirements Identification Documents functional areas, the Nuclear Regulatory Commission's Inspection and Enforcement Manual, and the Board's safety orders of interest. This evaluation was completed and resulted in the identification of a comprehensive set of review areas that address all aspects of safety to the public, worker, and environment. The review areas will be categorized as functional areas with topical areas as needed within each functional area. The functional areas will be organized in a logical manner to ensure effective integration within the review areas.

The CRADs associated with these review areas were divided into three groups to facilitate their development.

CRADS TO BE DEVELOPED FOR THE NUCLEAR SAFETY OVERSIGHT MANUAL

GROUP A CRADs

- Integrated Safety Management, including: annual ISM system review and ISM description update; effectiveness of ISM continuing core expectation implementation; identification and flow-down of requirements including safety management Functions, Responsibilities, and Authorities; feedback and improvement mechanisms including Occurrence Reporting, issues management, corrective action program, and Operating Experience program; and activity level work planning and control.
- Nuclear Safety Management Rule requirements, including development, review, approval, and implementation of documented safety analyses, technical safety requirements, and un-reviewed safety question programs.
- Nuclear Facility Safety Design, including identification, review and approval of facility and

system design requirements and integration with the development and approval of the preliminary documented safety analysis and integration with project critical decisions.
- Fire Protection Program
- Criticality Safety Program
- Readiness Review Program
- Nuclear Explosive Safety Program
- On-site Packaging and Transportation Program

GROUP B CRADs

- Quality Assurance Program, including review and approval of QA program plans, and implementation of QA program elements.
- Radiation Protection Program
- System Engineering, including Contractor Cognizant System Engineer Program, Configuration Management Process, Safety System Operability, Safety System Modification Design requirement development, review and approval
- Maintenance Program, including review and approval of the maintenance implementation plan and additional topical areas for selected elements of a maintenance program.
- Conduct of Operations Program, including review and approval of conduct of operations applicability matrix, and additional topical areas for selected elements of a conduct of operations program.
- Training and Qualification Program, including implementation of nuclear facility training program for contractor personnel and implementation of Technical Qualification Program requirements for federal personnel, and implementation of Facility Representative and Safety System Oversight Program requirements (for DOE only)
- Emergency Management Program, including implementation of Accident Response Group and Radiological Assistance Program
- Radioactive Waste Management Program
- Nuclear Material Management

GROUP C CRADs

- Worker Safety and Health Program, including Occupational Exposure and Employee Concerns Programs, and topical areas such as electrical safety, construction safety, explosive safety, firearms safety, chemical safety, etc.
- Decontamination and Decommissioning Activities
- Environmental Protection/Restoration Activities
- Safeguards and Security Interface with Safety

Finalization of the DOE Oversight Manual will not delay issuance and use of the oversight CRADs. These will be issued for use and comment as soon as they are useful to the organizations performing oversight. Additionally, as part of feedback and improvement, existing lines of inquiry and other available review tools for each functional/topical area will be collected from the field following

completed reviews. These checklists and lines of inquiry will be validated and provided as guidance in developing and tailoring specific functional/topical area CRADs.

Deliverables/Milestones

Commitment 4: Issue DOE Policy and Order on Oversight.

Lead Responsibility:	OA-1
Deliverable A:	DOE Policy 226.1 on Oversight, approved and issued by the Secretary
Due Date A:	June 2005
Deliverable B:	DOE Order 226.1 on Oversight, approved and issued by the Secretary
Due Date B:	June 2005

Commitment 5: Issue DOE Safety Oversight Manual.

Lead Responsibility:	EH-1
Deliverable A:	Draft DOE Safety Oversight Manual, including CRADs, ready for Board review and comment.
Due Date A:	July 2006
Deliverable B:	Approved DOE Safety Oversight Manual
Due Date B:	Three months after draft Manual is provided for Board review and comment (per commitment 5A). [September 2006]

Integration with ISM system

This topic is clearly focused on improving consistency and completeness of implementation of ISM Core Function #5 – Feedback and Improvement.

5.1.3 Instituting a Nuclear Safety Research Function

Issue

DOE should establish an integrated corporate program for assessing, prioritizing, integrating and managing applicable nuclear safety research (including analysis, testing, and development).

Basis

To improve Federal safety assurance, a strong nuclear safety research program is necessary. Currently, nuclear safety research decisions are made either by program offices based on perceived need, or by established groups that are also authorized to make decisions. While program office decisions of need may be coordinated with other offices, particularly if additional funding is needed, there is no requirement to seek collaboration or participation. The current nuclear safety research program is fragmented and not consistently prioritized relative to the need.

Resolution Approach

DOE nuclear operations demand a high level of safety and attention to detail, particularly for operations involving high consequence, low probability accidents. These operations also demand rigorous research and development. An integrated nuclear safety research program will preserve key needs, better integrate research development, and provide critical information to enhance decision-making. This effort also needs to ensure that when nuclear safety issues arise, the proper research response is designed, authorized and carried out, without duplicating normal programmatic research that enhances efficiency or effectiveness of processes and technologies. The objectives of the nuclear safety research program will include:

- Maintaining nuclear safety core capability for the Department,
- Advancing the fundamental understanding of nuclear safety science and technology,
- Coordinating nuclear safety research across the Department,
- Advancing the information needed to develop technical directives,
- Developing and maintaining technically competent safety professionals, and
- Providing generic support for nuclear weapons activities, nuclear energy programs, nuclear materials activities, and nuclear waste programs.

Completed Actions. The Secretary formally established that the Assistant Secretary for Environment, Safety and Health (EH) has primary responsibility for the nuclear safety research function. The Secretary formally assigned the following roles and responsibilities to the Assistant Secretary for EH:

- Establish the Office of Nuclear Safety Research;
- Develop, prioritize and approve an annual nuclear safety research plan that meets the needs of the DOE ESE CTA and the NNSA CTA and that takes into account information obtained through the operating experience program;

- Implement the annual nuclear safety research plan;
- Identify changes in DOE directives and standards, when appropriate, based on nuclear safety research results;
- Maintain adequate numbers of technically competent personnel necessary to fulfill nuclear safety research responsibilities within the Office of Nuclear Safety Research; and
- Participate in and represent DOE at national and international nuclear safety research organizations and their activities.

The Assistant Secretary for Environment, Safety and Health has:

- Assigned the Office of Nuclear Safety Research to the Office of Corporate Performance Assessment (EH-3);
- Completed the initial staffing of the Office of Nuclear Safety Research, including assignment of an Acting Responsible Manager.
- Defined the funding needs for the Office by preparing, submitting, and approving funding needs.
- Initiated interagency information exchange activities on nuclear safety research.

General Approach. The EH Office of Nuclear Safety Research will use the basic framework indicated below in carrying out its duties:

- Identify potential nuclear safety research needs.
- Evaluate and prioritize potential nuclear safety research needs.
- Select nuclear safety research projects for funding.
- Manage nuclear safety research projects.
- Disseminate nuclear safety research findings.

Identify potential nuclear safety research needs. The DOE Office of Nuclear Safety Research will identify research needs for nuclear safety design, analysis, testing, construction, and operation through several continuous processes, including: (1) EH's performance assessment trending of operating experience and authorization bases issues, and (2) aggressive solicitation of research needs from the CTAs and their staffs, line and field organizations, and contractor groups, such as EFCOG (Energy Facilities Contractors Group) and NLIC (National Laboratory Improvement Council). The Office of Nuclear Safety Research will conduct periodic meetings with these organizations to proactively request potential issues for research study, to discuss safety trends that could lead to the need for safety research, and to review the results of DOE analyses that indicate the potential need for additional nuclear safety research. The Office will also evaluate opportunities for improvement in the Department's directives and standards systems, and pursue potential improvements that may be possible with increased knowledge and understanding.

To help in identifying potentially beneficial research and to avoid redundant work, the DOE Office of Nuclear Safety Research will also maintain awareness of nuclear safety research being conducted by DOE line organizations. The Office will integrate potential needs identified with the safety research already occurring across the complex to maximize research benefits. In addition, the

Office will actively interface with the NRC, INPO, and other organizations of the commercial and international nuclear industry to obtain research results and information useful to DOE's nuclear safety interests.

Evaluate and prioritize potential nuclear safety research needs. The Office of Nuclear Safety Research will develop informational scoping packages for each identified safety research issue/need/problem. Each informational package will fully describe: the safety issue/problem to be studied; the possible research envisioned to address the issue; the expected schedule to complete the task, the expected cost to perform the research task; and, the expected benefit to DOE for conducting the research and resolving the safety issue.

Each fall, the Office of Nuclear Safety Research will formally present the informational scoping packages to the EH Deputy Assistant Secretary for Corporate Performance Assessment (EH-3). EH-3 will evaluate the informational packages and will establish the priority for these potential research requests. The Office of Nuclear Safety Research will then take the priority rankings and will develop the annual nuclear safety research plan. This annual research plan will be reviewed and approved by the Assistant Secretary for Environment, Safety and Health.

Select nuclear safety research projects for funding. The Office of Nuclear Safety Research has the primary responsibility for an annual nuclear safety research plan, through which research projects will be developed, prioritized, and funded. The Assistant Secretary for the Office of Environment, Safety and Heath will approve this plan, with concurrence from DOE ESE and NNSA CTAs. The Office of Nuclear Safety Research will fund specific nuclear safety research projects/efforts based on the approved plan.

Manage nuclear safety research projects. The Office of Nuclear Safety Research will actively manage nuclear safety research projects that it funds to ensure they are conducted on schedule and as designed. The Office will monitor and evaluate research performance to ensure that research funding is being well spent.

Disseminate nuclear safety research findings. The Office of Nuclear Safety Research will disseminate nuclear safety research findings through a variety of mechanisms. For example, the Office will prepare and issue an annual nuclear safety research report for approval by the Assistant Secretary for Environment, Safety and Health. The Office will also identify any new directives or standards, or changes to directives and standards that may be indicated by research results.

The EH Office of Nuclear Safety Research plans to implement the following activities on its path toward full implementation:

- Establish and formalize Office processes for identifying, prioritizing, selecting, executing safety-related research and development;
- Describe the interfaces between the nuclear safety research program and other organizations (e.g., Program Secretarial Offices including the Office of Science, sites, CTAs); and
- Determine the Office technical staffing needs, interview candidates, hire staff, as necessary.

The nuclear safety research function will work with DOE line organizations and the CDNS and the ESE CENS on a continuous basis to determine the research needs for nuclear safety design, analysis, testing, construction, and operation. EH has been assigned the primary responsibility for this function which focuses on safety research in areas that need further attention such as risk management and fire safety. This does not preclude other organizations, such as EM and NNSA, from conducting research, as required, to meet their unique needs. EH will maintain cognizance of these activities.

To fully implement the nuclear safety research function, the Department has identified the following three key milestones:

1. The nuclear safety research function is formally established – the organizational placement of the function within EH is determined, the responsible leader (acting or permanent) has been named, and the roles and responsibilities have been broadly defined – The Secretary approved the roles and responsibilities in April 2005.

2. The nuclear safety research function has adequate processes and technical capabilities to perform – the key processes for identifying, prioritizing, and executing nuclear safety research are formally established and agreed-upon, and the key critical staff positions that support the function are established.

3. The nuclear safety research function is fully implemented – the nuclear safety research function has sufficient capability and resources (personnel, funding, etc.), has proven effective processes in operation describing how the function is implemented, has a demonstrated record of performance, and feedback is available on its impact.

The Office of Nuclear Safety Research will technically and programmatically lead each research project that it funds. This will include clearly defining the scope of each research project; developing schedules with intermediate milestones; and reviewing/verifying the research findings, including use of peer review where applicable.

Deliverables/Milestones

Commitment 6: Formally establish the nuclear safety research function (as described above).

Lead Responsibility:	Secretary of Energy
Deliverable:	Secretarial memo identifying the roles and responsibilities of the nuclear safety research function.
Due Date:	**Completed - April 26, 2005**

Commitment 7: Provide adequate processes and technical capabilities for the nuclear safety research function (as described above).

Lead Responsibility: EH-1

Deliverable A:	Letter report to the Secretary declaring that adequate processes are in place and agreed upon and providing the basis for this declaration.
Due Date A:	Six months after formally establishing the nuclear safety research function, per Commitment 6. [October 2005]
Deliverable B:	Letter report to the Secretary declaring that adequate technical capabilities are available and providing the basis for this declaration.
Due Date B:	Nine months after formally establishing the nuclear safety research function, per Commitment 6. [January 2006]

Commitment 8: Fully implement the nuclear safety research function (as described above).

Lead Responsibility: EH-1

Deliverable:	Letter report to the Secretary declaring the nuclear safety research function fully implemented and providing the basis for this declaration.
Due Date:	Twelve months after providing adequate processes and technical capabilities for the nuclear safety research function, per Commitment 7. [January 2007]

Integration with ISM system

This topic is clearly focused on improving consistency and completeness of implementation of ISM Guiding Principle #5 – Identification of Safety Standards and Requirements and Guiding Principle #6 – Hazard Controls Tailored to Work Being Performed. This principle permeates the performance of all ISM core functions at all levels. This topic is most clearly related to the ISM functions related to feedback and improvement through revised requirements and directives: #1 – Define Work Scope, and #5 – Feedback and Improvement. The actual research will often be focused on ISM core functions related to understanding hazards and developing controls: #2 – Identify Hazards, and #3 – Develop Hazard Controls.

5.1.4 Establishing Clear Roles, Responsibilities, and Authorities

Issue

The Department's process for delegating authority from Headquarters to the DOE Field Offices for safety responsibilities must be more clearly defined.

Basis

Departmental assignments of safety responsibilities are captured in the Department's FRAM, for which EH is the OPI. Assigned headquarters officials may delegate authority to subordinate field personnel to implement these assignments, but may not delegate their responsibilities for ensuring safety. Recent Department decisions have decentralized many responsibilities from Headquarters to field offices. While decentralization is useful in improving productivity and moving decision-making closer to the work, sometimes delegations of authority have been made using inconsistent standards and without verifying individual and organizational capabilities to carry out the responsibilities. To have confidence that safety responsibilities are properly performed, the Department must more clearly establish processes and criteria for delegations of authority. After delegations of authority are made, the delegations must be periodically reviewed to ensure that the individuals and organizations maintain the necessary capability and capacity on which the delegation was made.

Resolution Approach

For each identified safety responsibility, the Department will determine whether authority to fulfill these responsibilities can be delegated from Headquarters to the DOE Field Offices. The Department's FRAM captures those instances where delegations of authority are not allowed. For each safety responsibility for which authorities can be delegated to the field offices, the following criteria need to be evaluated and deemed acceptable:

- Qualifications, experience, and expertise expected in the position receiving the delegation.
- Qualifications, experience, and expertise of the organization receiving the delegation.
- Proper framework of processes and procedures to implement the delegated authorities.
- Sufficient resources.
- Periodic re-verification of capability and capacity and demonstrated performance.
- Compensatory measures implemented, if needed.

The Department will clearly define the process and criteria for making these delegations of authority. This will include: (1) review and verification of qualifications, experience, and expertise of the primary recipient of the delegation; (2) review and verification of qualifications, experience, and expertise of the staff of the primary recipient of the delegation; (3) review of the processes and procedures in place in the organization of the primary recipient of the delegation; (4) review and verification of adequate resources, both technically qualified staff and sufficient funding; (5) bi-annual (every 2 years) re-verification for all delegations; and (6) definition of compensatory measures as needed.

The rigor and formality of the delegation of authority process may vary based on the risk associated with the assigned responsibilities. Nuclear safety responsibilities, such as safety basis processes and start-up approvals, would require the highest standard of assurance. The Department will define and list the core nuclear safety delegations that require additional rigor in delegation, and clearly define additional process steps or criteria.

Implementation of the process for all field delegations will complete the actions needed to lift the existing restrictions on new safety delegations, established by the Secretary on July 21, 2004.

Beyond the scope of the Board's recommendation and the Secretary's acceptance, the Department recognizes that close attention to delegations of authority to field personnel needs to be balanced with appropriate attention to assignments of responsibilities to headquarters personnel. As such, the Department will also define a process for a documented bi-annual self-assessment for each program office to review the assignment of safety management roles and responsibilities within the program office. This will include: (1) review and verification of qualifications, experience, and expertise of the primary recipient of the delegation; (2) review and verification of qualifications, experience, and expertise of the staff of the primary recipient of the delegation; (3) review of the processes and procedures in place in the organization of the primary recipient of the delegation; (4) review and verification of adequate resources, both technically qualified staff and sufficient funding; (5) bi-annual (every 2 years) re-verification for all assignments; and (6) definition of compensatory measures as needed.

Pursuant to DOE Order 414.1C, headquarters organizations will establish Quality Assurance Programs (QAPs), which will describe quality assurance roles and responsibilities, how these organizations ensure the quality of the delegation of authority process and criteria, and how the quality assurance criteria are met.

The process and criteria for delegations will ultimately be added to the Department's Functions, Responsibilities and Authorities Manual (FRAM). Line organizations will be expected to verify delegations bi-annually (every 2 years) and to issue any new field delegations in accordance with the established process. The responsibility for satisfying this process will be with the office directors, who will need to devote sufficient staff and resources to sustain the process once established.

The Department's FRAM, maintained by EH, is periodically revised, per the following requirement: "Responsibilities: Update DOE M 411.1-1 every six months (DOE Manual 411.1-1C, *Safety Management Functions, Responsibilities, and Authorities Manual*, Table 7, Functions, Responsibilities and Authorities for the Assistant Secretary for Environment, Safety and Health, page 52)." The DOE headquarters program office and field element Functions, Responsibilities and Authorities (FRA) documents, are also reviewed periodically, on an annual basis, in a flow-down sequence, when possible, and revised as necessary. As various responsibilities described in this plan are implemented, the Department plans to make appropriate changes in the DOE FRAM, the headquarters program office FRA documents (such as the NNSA FRA document) and the field element FRA documents, in accordance with the normal schedules for updates. Oversight of all

assigned safety responsibilities, regardless of delegations, will be conducted in accordance with the process described in Section 5.1.2.

Deliverables/Milestones

Commitment 9: Define and implement the process and criteria for delegating authorities to field personnel for fulfilling assigned safety responsibilities, and for performing periodic self-assessments on assignment of responsibilities and authorities to headquarters personnel.

Lead Responsibility A & C: NA-1; US-ESE

Deliverable A: Process definition and criteria, approved by the Deputy Secretary

Due Date A: September 2005

Lead Responsibility B: CTAs

Deliverable B: Report to the Secretary on review activities to evaluate implementation of the processes and criteria for delegating authorities to field personnel for fulfilling safety responsibilities, and to determine whether all existing delegations of authority to the DOE Field Offices have been and are being made using these new processes and criteria.

Due Date B: February 2006

Deliverable C: Approved biennial program office self-assessments of safety function assignment at the program office level.

Due Date C: Twelve months after issuance of the process and criteria definition for HQ responsibilities self-assessment, per Commitment 9A. [September 2006]

Commitment 10: Develop and implement QAPs as required by DOE O 414.1C, "Quality Assurance."

Lead Responsibility: NA-1, US-ESE and EH

Deliverable A: Approved HQ program office QAPs, with approved paths forward and schedules for achieving full implementation, including revision and implementation of field element QAPs.

Due Date A: November 2005

Deliverable B: Approved Field Element QAPs.

Due Date B: Completion in accordance with schedules provided in Commitment 10A.

Integration with ISM system

This topic is clearly focused on improving consistency and completeness of implementation of ISM Guiding Principle #3 – Competence Commensurate with Responsibility. This principle permeates the performance of all ISM core functions at all levels.

5.1.5 Ensuring Technical Capability and Capacity to Fulfill Safety Responsibilities

Issue

DOE must establish and maintain the technical capability and capacity to fulfill its safety responsibilities at all levels of the Department.

Basis

Highly qualified people are essential for safety. Recruiting, training, and retaining the right people are central priorities for federal safety assurance. One of the ISM principles is technical capability consistent with responsibilities. In other words, DOE needs the right people with the right experience, qualification and training in the right roles. Decision-makers must have the qualifications and training necessary to fulfill their safety responsibilities. High Reliability Organizations consistently demonstrate the attribute of valuing technical excellence and expertise.

An NNSA team reviewed the Columbia accident report for applicable lessons. The team concluded that erosion of technical capability is a concern within NNSA. The team pointed to major reductions in nuclear safety expertise within NNSA during the recent organization changes. Following organizational changes, EM is re-evaluating its technical expertise to fulfill its safety responsibilities, including its oversight responsibilities. In addition to these issues, DOE is facing a long-term challenge in maintaining a technically capable workforce. Over the next five years approximately one half of the DOE workforce will become eligible to retire. The Department has the opportunity to attract highly-qualified personnel to replenish its technical staff from the loss of an expected large number of technical employees retiring from the Department.

Resolution Approach

To improve the quality and rigor of technical qualifications across the Department, the Department will identify 2-3 people who are the most experienced and technically capable in at least 5 selected functional areas and charge these individuals with a central role in the qualification of others. Once identified, these persons will assist the Department in improving overall technical capability. Potential activities would include providing technical exams to candidates in a particular functional

area, reviewing technical qualification standards, evaluating ongoing proficiency standards, and conducting ongoing training. These personnel could also provide training to others in particular functional areas. This will use the high-quality technical talent that exists within certain areas of the Department to raise the overall standard of technical qualifications across the Department.

To address the identified need to provide supplemental training to DOE senior personnel, including new DOE decision-makers, the Department has developed and implemented a structured training workshop tailored to these senior personnel. This training is called Nuclear Executive Leadership Training and was first conducted May 9-13, 2005. The Under Secretaries for NNSA and ESE identified the individuals who participated. This program tailored training based on the experience and expertise of identified senior personnel. Another session is planned for Fall 2005. The Department will evolve this training into an institutionalized leadership and development program.

The Department's vision is to be recognized among all federal technical agencies for the excellence of its federal staff. Further, the Department wants to have sufficient capacity of technically excellent personnel such that continuous learning and continuous training is a valued norm. The Department needs competent technical personnel with the knowledge and capability to be demanding customers of the Department's contractors. The Department intends to implement new, innovative, and practical ways to achieve its vision of a technically excellent staff.

To begin progress in the direction of this vision, the Department's Federal Technical Capability Panel (FTCP) reviewed past data and assessments of the Department's performance in recruiting, developing, training, qualifying, maintaining proficiency, and retaining technically excellent personnel who are fulfilling safety responsibilities, and identified areas where improvement is needed. This FTCP-led review is intended to raise the sense of urgency on this issue and to focus attention on strong, immediate actions for improvement. Previous assessments had already identified many of the relevant issues. For example, the FTCP review addressed the low participation by headquarters personnel in the Technical Qualification Program. These assessments included: workforce staffing analyses; Facility Representative quarterly reports; FTCP quarterly reports; internal reviews such as annual ISM reviews and OA independent assessments; internal evaluations, such as the NASA Columbia investigation report; and external reports and correspondence, such as those from the Board and the March 1999 Report of the "Chiles Commission" on Maintaining Nuclear Weapons Expertise. The FTCP also evaluated its effectiveness at overseeing these activities. The FTCP identified corrective actions to improve recruiting, developing, training, qualifying, maintaining proficiency, and retaining technical personnel, as well as enhancing FTCP effectiveness. The FTCP will take the Department lead in managing implementation of the corrective actions.

To review the Department's path forward toward achieving the vision of technical excellence, the Department, consistent with the provisions of the Federal Advisory Committee Act, will enlist the help of an emeritus-level panel with experience and expertise in Federal and large commercial technical organizations, particularly High Reliability Organizations. This panel will review Department performance in this area and make recommendations to the Secretary for improvements.

The Department will provide the panel with a summary of previous reviews and findings in the DOE technical capabilities area. This panel will take a fresh look at the status of the Department's efforts to upgrade technical capability. The main emphasis for this panel will be on high-impact, practical recommendations to achieve change. The panel will be charged to provide specific attention on the following topic areas:

- The overall Department goal, strategy, priority, and processes related to recruiting, developing, and retaining excellent technical personnel
- The use of incentives and rewards for attracting and retaining excellent technical personnel
- The relationship between position descriptions, technical capability expectations, and performance evaluations
- The ability of DOE to move federal technical staff between site locations as needed
- The ability of DOE to make changes in federal technical assignments based on personnel performance
- The use and effectiveness of the Technical Qualification Program
- The effectiveness of ongoing technical training and development
- The effectiveness of the Federal Technical Capability Panel
- The top Federal staffing needs to enhance nuclear safety

To address the staffing and technical qualification for the federal safety assurance roles described in this implementation plan, and to address inconsistencies in current staffing and technical qualification for federal safety roles, the Department will take the following steps:

- Complete a comprehensive federal staffing analysis at headquarters and the field offices with federal safety assurance responsibilities.
- Identify gaps based on the staffing analysis, and hire or re-assign personnel with the proper education and experience to fill gaps.
- Provide the new and reassigned personnel the training and mentoring necessary to fulfill their safety responsibilities.
- Assign appropriate technical qualification standards to the identified federal safety assurance personnel and individual objectives for completing qualifications.
- Identified individuals will complete technical qualifications to identified standards.

Deliverables/Milestones

Commitment 11: DOE will identify highly qualified and experienced personnel who will assist the Department in improving overall technical capability.

Lead Responsibility:	Chairman, FTCP (as an agent for the Deputy Secretary)
Deliverable:	A report identifying high-qualified and experienced personnel in select functional areas and describing their roles in improving overall technical capability, as well as a plan for implementing this concept and a mechanism for maintaining the list.

Due Date: July 2005

Commitment 12: DOE will provide structured training (such as the Nuclear Executive Leadership Training) for safety professionals, senior managers and decision-makers responsible for nuclear safety, including those responsible for nuclear safety oversight.

Lead Responsibility: NA-1 and US-ESE

Deliverable: A report describing the Nuclear Executive Leadership Training program, including the training materials, training periodicity, the criteria for and status of personnel identified for training, the date when all identified personnel will complete training, an assessment of the training's effectiveness, and plans for fully developing the Department's training and professional development program.

Due Date: August 2005

Commitment 13: The FTCP will develop corrective actions to improve recruiting, developing, training, qualifying, maintaining proficiency, and retaining technical personnel, as well as FTCP effectiveness. The corrective action plan will include a prioritized list of key positions that should be filled to enhance safety.

Lead Responsibility: Chairman, FTCP

Deliverable: Corrective Action Plan, approved and issued by the Deputy Secretary

Due Date: August 2005

Commitment 14: DOE will commission an emeritus-level panel to review the Department's efforts for recruiting, developing, and retaining technically excellent personnel to fulfill safety responsibilities, evaluate the FTCP's effectiveness, evaluate associated organizational systems and impediments, and make recommendations to the Secretary for improving the Department's effectiveness in the areas reviewed.

Lead Responsibility: Deputy Secretary

Deliverable: Report to the Secretary

Due Date: September 2006

Commitment 15: DOE will complete technical staffing of the personnel placed in identified positions needed to perform the federal safety assurance function for nuclear facilities.

Lead Responsibility: Deputy Secretary

Deliverable: A report on completed DOE staffing actions, with status of technical qualifications.

Due Date: December 2006

Integration with ISM system

This topic is clearly focused on improving consistency and completeness of implementation of ISM Guiding Principle #3 – Competence Commensurate with Responsibility. This principle permeates the performance of all ISM core functions at all levels.

5.1.6 Verification of Federal Safety Assurance Capability

After at least one full year of implementation experience after the CTA offices are fully implemented (after completion of CTA milestone 3), the Deputy Secretary will direct an effectiveness review to be performed of all areas related to establishing a robust Federal Assurance Capability. The scope of this review will include all areas covered in section 5.1 of the Implementation Plan. Any areas that are not ready for review at the scheduled due date will be the focus of subsequent reviews. A review plan with CRADs will be developed to guide the review. Follow-on verification activities will be performed as necessary to determine when objectives have been successfully institutionalized and whether additional improvement opportunities exist.

Commitment 16: Verify Federal Safety Assurance Capability.

Lead Responsibility: OA-1

Deliverable: Report to the Secretary

Due Date: Twelve months following completion of Commitment #3. [January 2008]

Integration with ISM system

This topic is clearly focused on verifying effectiveness of the actions described in section 5.1, consistent with ISM Core Function #5 – Feedback and Improvement.

5.2 Learning from Internal and External Operating Experience

5.2.1 Department-wide Action Plan for Columbia and Davis-Besse Events

Issue

The Department has not completed identification and full implementation of applicable lessons from the Columbia accident and the Davis-Besse incident.

Basis

Two significant external events occurred in the last 2 years – the Columbia accident and the Davis-Besse incident – which are profound enough for the Department to pro-actively perform thorough evaluations for applicable lessons learned, to identify actions to take to implement these lessons, and to ensure these actions are effectively implemented. The Department has started on this effort through various evaluations of these events. While NNSA conducted a comprehensive evaluation of the Columbia event, further work is planned to capture the lessons learned from the Davis-Besse incident and to define Department-wide actions to capitalize on the lessons learned from the experience of others.

Resolution Approach

To resolve this issue, the Department will complete its evaluation of the Columbia and Davis-Besse events and implement applicable lessons. To develop this DOE-wide action plan, the Department's Working Group relied heavily on the previous work and reviews performed by various DOE elements, as well as the insights gained by the nuclear industry and NASA. Of particular value was the review performed by Brigadier General Haeckel, NNSA, of the Columbia Accident Investigation Board (CAIB) Report. The results of that review were published February 9, 2004, and identified relevant lessons learned from the NASA experience. The Working Group also received input from each ESE organization on the status and results of their individual reviews of the Columbia and Davis-Besse incidents. In addition to DOE-specific reviews, the Working Group also benefited from reviews and evaluations performed by the Institute of Nuclear Power Operations (INPO), Nuclear Regulatory Commission (NRC), and NASA's own investigation of the Columbia accident. To ensure completion of identified action items, the Working Group will assign each commitment to a responsible DOE senior manager with specified completion dates.

The Department's action plan has been drafted and is being reviewed prior to finalization. One of the actions in the Department's plan will be the establishment of a Differing Professional Opinion process throughout the Department.

Deliverables/Milestones

Commitment 17: Complete Department-wide formal review of Columbia and Davis-Besse events, and develop consolidated Department-wide Action Plan.

Lead Responsibility:	Deputy Assistant Secretary for Corporate Performance Assessment (EH-3)
Deliverable:	Consolidated Department-wide Action Plan, approved and issued by the Deputy Secretary, and describing who will determine that corrective actions have been effective
Due Date:	July 2005.

Integration with ISM system

This topic is clearly focused on improving consistency and completeness of implementation of ISM Core Function #5 – Feedback and Improvement. Operating experience is one form of feedback available to improve performance. Detailed review and action planning in response to the Columbia and Davis Besse events is part of the corporate-level Feedback and Improvement function.

5.2.2 Comprehensive Operating Experience Program

Issue

The Department's comprehensive operating experience program needs to be upgraded to ensure systematic, timely attention to identify, evaluate, and implement applicable lessons from both internal and external events.

Basis

The need for an effective comprehensive operating experience program is one of the key lessons from both the Columbia and the Davis-Besse events. The Board's Recommendation 2004-1 and other feedback from several sources within the Department have led to the conclusion that the Department needs to make substantial improvement in this area. Effective safety cultures learn from experience, regardless of whether the experience is their own or that of others. A strong questioning attitude and the ability to learn from experience are attributes consistently evident in HROs. These organizations are learning organizations, which have implemented systems and processes to facilitate continuous learning and continuous improvement.

Resolution Approach

To resolve this issue, the Department will enhance its comprehensive operating experience program to include key elements used in the commercial nuclear industry's operating experience program, established and run by the Institute of Nuclear Power Operations (INPO). The Department's existing program is defined by DOE-STD-7501-99, *The DOE Corporate Lessons Learned Programs.* This program will be significantly upgraded and necessary requirements will be added to the directives system. This program is one of many elements supporting the "feedback and improvement" function of the Department's ISM system.

The program will be modeled after the INPO Significant Event Evaluation – Information Network (SEE-IN) Program. The DOE Operating Experience Program will be comprised of four levels of operating experience with corresponding action

1. Special Operations Report – issued by the Deputy Secretary to inform the DOE complex of the most significant events or trends of concern to management and require senior management action to verify that performance expectations are met.

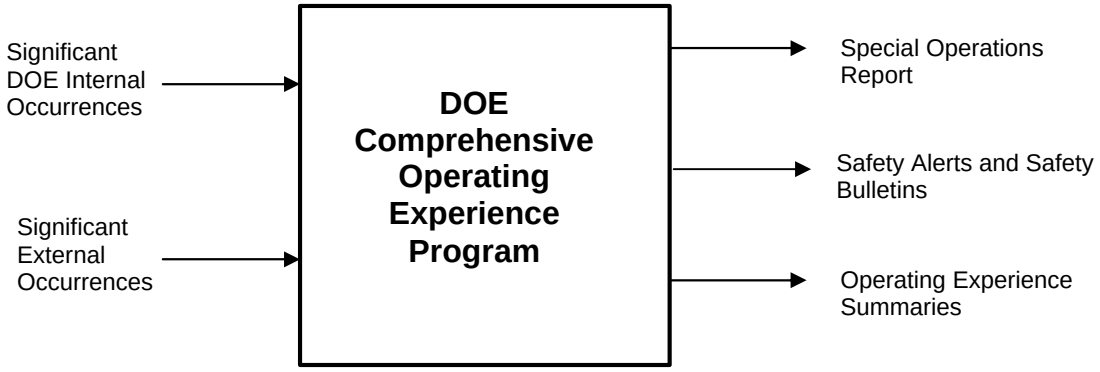
2. Safety Alert – issued by the Assistant Secretary for EH to inform the DOE complex (or affected sites) of a safety issue that can adversely affect operations. Examples include an immediate conduct of operations problem, suspect/counterfeit parts, or defective items that require near-term action and management response. A Safety Alert also requires feedback to EH from all DOE sites whether or not they found the problem.

3. Safety Bulletins – issued by the Assistant Secretary for EH when analysis of operating experience data shows a trend that warrants senior Headquarters and Field Manager attention. Safety Bulletins recommend specific corrective actions.

4. Operating Experience Summaries – biweekly (every 2 weeks) publications targeted to first-tier supervisors, work planners, and crafts personnel that contain DOE-wide occurrence information and lessons-learned from which sites can benefit. These summaries include substantive analysis of reported events, root and contributing causes, similar events, and corrective actions.

The INPO operating experience program is a cornerstone of the commercial nuclear industry's approach for learning from experience. INPO sends out noteworthy operating experience, sorted into two levels of importance. The more important items require responses describing review and actions taken. The less important items still require review and action, but do not require submittal. Regardless of importance level, when no action is taken, organizations are required to describe and document why no actions are applicable or necessary. Implementation of the operating experience program is reviewed annually to ensure that sites are performing adequate reviews and taking appropriate corrective actions as warranted. EH will analyze and identify those operating experiences and safety issues that need attention, and identify the level of importance/action, with the concurrence of line management representatives from ESE and NNSA. Program offices and field elements will be responsible for verifying implementation for all levels of operating experience reports through line management oversight. EH will provide feedback to NNSA and the

ESE program officers on program level implementation using appropriate protocols established in the Operating Experience program directives. EH will perform annual self-assessment reviews on the effectiveness of its program to guide ongoing program improvement.



The addition of the INPO-like elements to the Department's existing lessons learned/operating experience program will enhance the Department's operating experience program. Once fully established, the Department's comprehensive operating experience program will accomplish the following functions:

- Increase integration and collective analysis of the results of various feedback systems to identify adverse trends or areas where increased attention is needed
- Identify and review internal occurrences, accidents, and other events of interest
- Identify and review external events of interest
- Determine the level of Department response appropriate for each occurrence
- Promote general awareness of operating experiences through various regular communications vehicles
- Require action on the part of line management in response to certain occurrences; action may include review, analysis, identification and implementation of corrective actions. Depending on the severity of the operating experience, actions will be taken at the local level, and subject to later reporting, verification and oversight.
- Provide briefings and training sessions to promote general awareness and valuing of operating experience, and to promote understanding and actions on specific high-profile operating events
- Maintain a searchable lessons learned database
- Perform annual self-assessments of the effectiveness of the operating experience program, including benchmarking of other programs, and solicitation of feedback from users, to continue to improve program effectiveness

The Department's Comprehensive Operating Experience Program will include all of these attributes and issue appropriate Department requirements and guidance.

The Department will also initiate annual site training sessions on operating experience. Implementation will be verified periodically as part of ongoing line oversight reviews, as described

in Section 5.1.2. The Department will develop specific CRADs for oversight of field element Operating Experience Programs to review analysis of applicability of operating experience information, identification of response actions, and follow-on completion and effectiveness reviews of these actions. These CRADs will be included in the Safety Oversight Manual.

Deliverables/Milestones

Commitment 18: Develop Comprehensive DOE Operating Experience Program.

Lead Responsibility: EH-1

Deliverable:	DOE Directive on Operating Experience, approved and issued by the Deputy Secretary, along with implementation direction and a schedule to complete implementation.
Due Date:	January 2006

Commitment 19: Demonstrate Performance of DOE Operating Experience Program.

Lead Responsibility: Applicable Program Secretarial Officers and Field Element Managers

Deliverable:	Line oversight review reports on the implementation of the operating experience program at the line program's sites.
Due Date:	Eighteen months after issuance of the DOE directive on Operating Experience, per Commitment 18. [July 2007]

Integration with ISM system

This topic is clearly focused on improving consistency and completeness of implementation of ISM Core Function #5 – Feedback and Improvement. Operating experience is one form of feedback available to improve performance. The organization must act effectively to turn feedback into long-term performance improvement.

5.2.3 Verification of Implementation of Operating Experience

Following the conclusion of all planned action in this section (5.2) and the associated line verification activities, the Office of Independent Oversight and Performance Assurance (OA) will perform an independent effectiveness assessment to determine whether the actions described in Section 5.2 have been adequately implemented and have resolved the identified safety issues.

Commitment 20: Verify effectiveness of implementation of implementation plan sections 5.2.1 and 5.2.2.

Lead Responsibility:	Office of Independent Oversight and Performance Assurance (OA)
Deliverable:	Verification report to the Secretary of Energy.
Due Date:	Four months following completion of both Commitment 19 and completion of the actions defined by the Department's action plan for Columbia and Davis-Besse in Commitment 17.

Integration with ISM system

This topic is clearly focused on verifying the effectiveness of the actions described in Section 5.2, consistent with ISM Core Function #5 – Feedback and Improvement.

5.3 Revitalizing Integrated Safety Management Implementation

The Department remains committed to ISM as the foundation of its safety management system and process. The Department recognizes that ISM is not being consistently implemented throughout the DOE complex. In particular, some DOE organizations are not consistently embracing and implementing ISM. Increased clarity of expectations and requirements for DOE organizations is expected to enhance the active engagement of DOE organizations.

The ISM areas of work planning and control and feedback and improvement were selected due to their importance, potential to leverage improvements in other areas, and evidence showing opportunities for continued improvement in these areas.

5.3.1 Enhancing ISM Implementation at DOE Headquarters and Field Offices

Issue

The Department's implementation of Integrated Safety Management within its Federal organizations can be improved through clear definition of federal expectations and federal ISM system descriptions.

Basis

The Department and its contractors remain firmly committed to ISM as first defined in 1996. Despite this, the Federal organizations have not consistently and completely implemented ISM. This is due to ambiguity in ISM expectations for the Federal level, inconsistent follow-up and oversight, and incomplete implementation guidance. The nature of Federal roles places strong emphasis on the ISM guiding principles. Over the past decade, High-Reliability Organization (HRO) attributes have been developed from low-probability high-consequence work experience and research findings. The Department's ISM principles and related guidance do not fully reflect the lessons learned about effective HROs.

Resolution Approach

The Department will clarify its expectations for DOE programs and field elements. For example, clear requirements and a set of expectations are needed for ISM system descriptions and for annual reviews and annual declarations. Results of annual reviews need to be effectively used to improve ISM. The Department will clarify existing ISM expectations for contractors regarding annual reviews and annual declarations, and clarify expectations regarding full ISM verifications. DOE programs and sites will develop and implement ISM system descriptions, if they have not already. In some cases, ISM system description requirements can be addressed in QAPs; in other cases, program FRA documents may be revised to address ISM system description requirements. Verification of implementation will take place as part of normally scheduled line oversight and independent oversight reviews.

To enhance the understanding of the desired environment for ISM, the Department has reviewed HRO attributes and evaluated how these attributes relate to the existing set of guiding principles and functions. This analysis also considered the lessons from Columbia and Davis-Besse, the INPO Nuclear Safety Culture Principles Document, the INPO Human Performance Initiative, and other recent work and research on safety culture. The Department completed this analysis and identified the following four supplemental high-reliability principles that merit enhanced focus and attention to help the Department establish the required environments for effective ISM implementation:

- High-Reliability Operational Performance
- Individual Attitude and Responsibility
- Performance Assurance
- Organizational Performance Improvement

The result of this effort, "Requisite Environment for Effective Implementation of Integrated Safety Management (ISM) Systems," is provided in Appendix F. This Appendix is labeled "draft" to reflect that it has not yet been fully institutionalized as part of the Department's directive system. To help reinvigorate the use of ISM to guide organizational performance improvement, this paper seeks to clearly describe the context or environment within which ISM must operate to be effective. With this vision, leaders throughout the organization can direct efforts to create the necessary environment for effective ISM implementation and, ultimately, positive culture change. This vision also seeks to clearly articulate expected, observable behaviors typical of the total environment within which ISM must be implemented to be fully effective. Leaders need to implement appropriate change strategies to make these behaviors recognizable and typical in their work environments. Achieving these desired work behaviors will result in greater productivity as well as improved safety.

In addition, the Department has clarified its expectations concerning implementation of ISM by DOE personnel. These expectations are provided in Appendix G. This Appendix is labeled "draft" to reflect that it has not yet been fully institutionalized as part of the Department's directive system. Basically, these expectations encompass:

- Annual ISM System Descriptions
- Annual Reviews of ISM Implementation
- Annual ISM Declarations
- Annual Performance Expectations and Performance Objectives

The Department will establish an ISM Manual to formally capture and institutionalize the DOE ISM expectations (Appendix G) and the "Requisite Environment" contents (Appendix F). Through institutionalizing the Department's ISM vision and expectations within the DOE directives system, affected parties will have ample opportunity to understand and appreciate the Department's direction. Additional experience in implementing these expectations will provide necessary feedback to further improve and clarify the ISM Manual and other ISM directives through future revisions.

A main thrust of the action in this section is focused on the DOE federal ISM system descriptions. Department personnel have a vital role to play in the Department-wide ISM system. The Department role is different from the contractor role, but it is important for assuring safety, and it needs to be clearly articulated. Examples of inherently Federal work that is required for the Department-wide ISM system to be effective include:

- Establishing missions,
- Establishing annual budgets, including making decisions on mission-safety trade-offs,
- Developing DOE safety rules, directives and standards,
- Assigning safety management roles and responsibilities,
- Establishing contracts, including delineation of safety requirements,
- Approving exemptions to safety requirements,
- Establishing a positive environment for effective ISM system implementation,

- Approving safety analysis reports and technical safety requirements,
- Approving authorization agreements,
- Performing operational readiness reviews,
- Maintaining operational awareness,
- Monitoring various sources of feedback information,
- Monitoring performance of corrective action and improvement action sub-systems,
- Managing the DOE operational experience program,
- Performing self-assessments of assigned federal work activities,
- Performing oversight of contractor work activities,
- Performing line management oversight of DOE activities, as appropriate,
- Performing independent oversight,
- Reviewing annual ISM declarations by contractors,
- Performing annual ISM effectiveness reviews,
- Approving annual performance objectives, performance measures, and commitments for contractors.

Real safety improvement comes when each of these safety functions is performed in an excellent manner. Real safety improvement will not be accomplished merely through development and issuance of ISM system descriptions. Rather, these descriptions will serve to facilitate and focus thinking and planning of an appropriate approach to safety management, and organizing and implementing the necessary follow-through activities. These descriptions will also capture and institutionalize future changes and improvements to the approach and provide new organization members with a handy road-map to see the full, integrated vision. These descriptions will allow line managers to monitor performance and also allow reviewers to evaluate whether the planned activities are being accomplished.

Federal personnel need to take a strong role in assuring effective contractor implementation of both ISM Guiding Principles and ISM Core Functions. The Department expects that contractor system descriptions will continue to be updated annually and reviewed by the local site offices as part of their oversight programs.

Additional elements of the Department's approach to revitalize the ISM infrastructure and move the Department forward with renewed vigor include:

- Clearly establishing ISM champions within all DOE program and field offices,
- Establishing an ISM working group supporting the champions to lead ISM reinvigoration,
- Conducting workshops for communicating vision and expectations, sharing guidance, sharing lessons learned and good practices, and developing consensus work products.
- Developing an action plan to address the findings from the August 2002 Idaho ISM workshop.
- Reviewing implementation experience after the Department organizations issue ISM system descriptions to determine whether there is a need to revise the expectations, provide new training or guidance, or take other actions for improvement.

- After at least 1 year of experience in meeting the new ISM expectations for DOE personnel, consider revising the existing DOE ISM policy, DOE ISM guide, DOE ISM systems verification team leader's handbook, and ISM DEAR clause. If the decision is made to move forward with revisions, strong input from field office representatives and contractors will be needed to make ISM directive changes effective.

Deliverables/Milestones

Commitment 21: Describe a path forward for linking HRO attributes with existing ISM principles and functions, and describe how these attributes will be incorporated in the Department's guidance directives.

Lead Responsibility: 2004-1 Implementation Team

Deliverable A: DOE reaffirmation of ISM and draft statement linking ISM with HRO attributes, approved by the Secretary of Energy

Due Date A: **Complete – See Cover Letter and Appendix F.**

Deliverable B: Letter from the 2004-1 responsible manager to the Board providing the Department's decision and basis on whether to issue the Appendix F ISM vision as a complementary ISM Policy or Notice.

Due Date B: July 2005

Commitment 22: Issue and implement expectations for DOE organizations regarding ISM implementation.

Lead Responsibility A: NA-1 and US-ESE

Deliverable A: A draft set of expectations for DOE ISM system descriptions for DOE headquarters and field organizations

Due Date A: **Complete – See Appendix G.**

Lead Responsibility B: EH-1

Deliverable B: New DOE Manual on ISM, institutionalizing the DOE expectations provided in Appendix G, issued for use.

Due Date B: December 2005

Lead Responsibility C: NA-1 and US-ESE and EH-1

Deliverable C:	Approved DOE ISM system descriptions (which may be addressed in revisions to QAPs or FRA documents) for DOE headquarters and field organizations that meet Appendix G expectations
Due Date C:	For Headquarters programs ISM system descriptions, 3 months after issuance of the approved ISM Manual per Commitment 22B [March 2006]; for field office ISM system descriptions, 8 months after issuance of the approved ISM Manual per Commitment 22B [August 2006]

Integration with ISM system

This plan section deals with the overall objective and methods of ISM. It involves reinvigorating the ISM program overall and throughout the complex.

5.3.2 Work Planning and Work Control Processes at the Activity Level

Issue

The Department needs additional improvement in consistency and reliability of work planning and work control performance at the activity level.

Basis

The need for additional improvement in work planning and work execution at the activity level has been identified by internal self-assessments, line and independent oversight, and Board oversight. Effective work planning and work control processes ensure that other activity level functions, such as hazards identification and controls are adequate to ensure safety and reliability. The current ISM system contains minimal expectations, and no explicit requirements, at any level to routinely assess the implementation of work planning and work control processes at the activity level.

Resolution Approach

The resolution approach is designed to promote local ownership of the problems and solutions. Specifically:

- Contractors and DOE field elements will perform initial assessments to evaluate the effectiveness of work planning and work control processes at the activity level. DOE's role to provide oversight and assistance in achieving the desired behaviors and processes will be considered in the assessments. A work planning CRAD will ultimately be institutionalized as part of the development of the DOE Safety Oversight Manual (see section 5.1.2).
- Based on these assessments, contractors and DOE field elements will identify specific areas where improvement is needed, and may identify recommended solutions.
- Contractors and DOE field elements will share their findings with each other, and participate in sessions to develop approaches for effectively addressing concerns and measuring improvement.

- DOE field elements and contractors will identify specific actions that they will pursue to correct identified weaknesses and deficiencies, specific schedules for completing these actions, and specific actions to continue to monitor performance in these areas.

NNSA has already initiated this action and held an initial work planning workshop. The lessons from the NNSA activities will be shared with the rest of the Department. NNSA has found multiple examples of problems cited with (1) job-hazard analysis at the task level, and (2) feedback and improvement specific to work planning, work control, and work performance. NNSA has also found multiple examples where line management has not taken sufficient steps to ensure that work is conducted strictly in accordance with established ISM system processes and procedures. Further, in some cases, there has been an over-reliance on automated job hazard analysis tools. NNSA's path forward includes development and promulgation of additional guidance and good practices, and follow-up workshops. NNSA also plans to revise and re-issue its draft lines of inquiry to capture expectations in this area. These lines of inquiry will be used to support an activity-level work planning and control CRAD developed for inclusion in the DOE Safety Oversight Manual.

Site action plans will be developed to drive further improvements in work planning and control. Site action plans may contain a variety of actions depending on the site-specific situation and root cause of deficiencies, including:

- Revised processes, based on good practices and operational experience from others
- A good practices handbook, if useful
- Additional training and supervision
- Additional oversight and monitoring
- Additional coaching
- Additional and more effective self-assessments
- More effective learning from self-assessments to realize improvements
- Recommended changes to Department directives and guidance, if needed

Like other technical areas, the Department will develop oversight CRADs to capture core expectations for work planning and control, as described in Section 5.1.2. Field and headquarters organizations will perform periodic oversight in accordance with the CRADs developed in accordance with Section 5.1.2.

Deliverables/Milestones

Commitment 23: Develop site office action plans to improve work planning and work control.

Lead Responsibility: NA-1 and US-ESE

Deliverable: Action plans, approved by field elements and HQ program office.

Due Date: February 2006

Commitment 24: Perform HQ line oversight on work planning and work control.

Lead Responsibility: NA-1 and US-ESE

Deliverable: Headquarters oversight reports, in accordance with approved CRADs.

Due Date: Eighteen months following approval of site office action plans, per Commitment 23. [August 2007]

Integration with ISM system

This topic is focused on improving consistency and completeness of implementation of three ISM Core Functions: ISM Core Function #3 – Develop and Implement Work Hazard Controls, ISM Core Function #4 – Perform Work Within Controls, and ISM Core Function #5 – Feedback and Improvement. The focus is on the planning, control, conduct, feedback, and improvement of work activities, with primary emphasis on contractor physical work activities, such as facility maintenance and operations activities.

5.3.3 Integration and Use of Feedback Mechanisms to Produce Improvement

Issue

The Department needs improvement in consistency and use of the core ISM function of "feedback and improvement," with emphasis on the "improvement" side.

Basis

The ISM core function, "feedback and improvement," is not yet performing as intended, according to a variety of sources. For example, the recent (July 2004) DOE Office of Independent Oversight Lessons Learned Report identified the "feedback and improvement" function as having important weaknesses and is not well established or implemented. DOE and its contractors have a variety of feedback mechanisms, including occurrence reports, self-assessments, oversight assessments, non-conformance reports, and others. In general, the Department is good at collecting "feedback," and not as good at making meaningful and lasting "improvement." For the Department's feedback mechanisms to be of benefit, deviations need to be reported and analyzed, and feedback mechanisms need to be integrated to identify problems and make improvements. Improved DOE attention to integration and use of "feedback and improvement" is very likely to generate improved attention and use by contractors as well. Effective reporting and improvement systems are essential elements of an effective safety culture, demonstrating core values of "questioning attitude" and "learning organization."

Resolution Approach

To guide resolution of this issue, a cross-functional Department team will develop a clear set of core expectations (criteria) based on ISM and related HRO attributes that address:

- Increased leadership emphasis on reporting, issue evaluation, corrective actions, and follow-up to ensure corrective actions are effective.
- Training on use of various reporting mechanisms, including Employee Concerns processes, Differing Professional Opinion processes, Non-Conforming Items processes, issues management processes, and other feedback mechanisms.
- Increased use of positive feedback, recognition, and rewards for individuals who report errors and concerns, regardless of who caused the error.
- Increased integration and collective analysis of the results of various feedback systems to identify adverse trends or areas where increased attention is needed.
- Increased effectiveness of Corrective Action processes for analyzing identified issues, determining corrective actions, and closing items only after corrective actions are independently evaluated to be effective.
- Increased use of performance measures in understanding effectiveness of issues management and corrective actions management systems. Specifically, increased use of metrics related to "repeat findings" is needed.
- More effective self-assessments and line oversight of the "feedback and improvement" core function to make these efforts more effective.
- Effective roll-up of year-end contractor and site office feedback results in the annual ISM reviews to identify specific areas for increased attention in the following year, including inputs to the annual planning and budgeting cycle.
- Effective roll-up of year-end program office feedback results, based on input from the site annual ISM reviews, to identify new goals and direction for improvement in the following year, including inputs to the annual planning and budgeting cycle, and goal setting as in the DOE Management Challenges.

The reference set of expectations for reporting, integration and use of the feedback findings and improvement actions will address implementation differences between HQ program offices, field elements, and contractors. The Deputy Secretary will direct DOE organizations to use the "feedback and improvement" expectations in development/revision and implementation of DOE ISM system descriptions. Sites will develop and implement plans of action to improve their "feedback and improvement" processes to meet the expectations defined above. After at least one year of experience is gained in implementing newly issued DOE ISM system descriptions, the line managers will review implementation of the "feedback and improvement" element and make mid-course changes as needed. Line managers will review the responses to the ISM expectations as part of the line oversight program and make adjustments to expectations and oversight, as appropriate. The assessments of the effectiveness of feedback and improvement mechanisms will be conducted using CRADs that will ultimately be institutionalized as part of the development of the DOE Safety Oversight Manual (see section 5.1.2).

Deliverables/Milestones

Commitment 25: Develop site office action plans to improve feedback and improvement.

Lead:	NA-1 and US-ESE
Deliverable:	Site-level action plans to improve "feedback and improvement" core element performance.
Due Date:	February 2006

Commitment 26: Review the implementation of "feedback and improvement" core element through disciplined line management oversight program, and provide both a summary status report to the Secretary and mid-course direction to direct reports on improving the institutionalization of ISM into the annual Departmental planning.

Lead:	NA-1 and US-ESE
Deliverable:	Report to the Secretary and direction to direct reports
Due Date:	March 2007

Integration with ISM system

This topic is clearly focused on improving consistency and completeness of implementation of ISM Core Function #5 – Feedback and Improvement.

5.3.4 ISM Verification

When ISM was originally implemented, the Department completed a series of thorough verifications of the effectiveness of the ISM systems as implemented. The ISM Guide currently describes that such thorough ISM system effectiveness verifications are needed when major changes are made. Implementation of ISM verifications has been inconsistent; some sites established sound basic systems, some sites had flaws and others never deployed systems. The Department now believes that full ISM verifications need to be conducted at each site periodically, on a staggered schedule throughout the complex, to determine whether program implementation of requirements is consistent with the Department's vision.

These periodic full verifications are intended to have a slightly different focus from the current ISM reviews. The performance of ISM to expectations should be captured adequately in the annual verifications. The periodic full verifications are intended to provide a more complete assurance to management on two fronts: 1) has the ISM been effective at all levels, including federal levels, and 2) are there enhancements in ISM that should be incorporated at the corporate level. Full ISM verifications are envisioned to occur at least every 5 years. More frequent full verifications may be appropriate where significant system or performance weaknesses are identified.

Some sites and field offices have decided to conduct full verifications every year. For these sites, the periodic full verifications will not differ significantly from the annual reviews. In general, full verifications differ from annual reviews as follows:

- Full verifications are led by a team leader who is not from the organization being reviewed.
- Full verifications have several team members who are not from the organization being reviewed.
- Teams for full verifications are typically at least 6-8 members, whereas annual reviews can be done with smaller teams.
- Full verifications are more comprehensive, covering ISM system implementation in more depth than annual reviews.

Combined teams of NNSA and ESE personnel will perform the two initial ISM verifications to foster shared learning. The assessments will be conducted using CRADs that will be institutionalized as part of the development of the DOE Safety Oversight Manual (see section 5.1.2).

Deliverables/Milestones

Commitment 27: Complete comprehensive (HQ program offices, sites, contractors) ISM reviews at two major sites with defense nuclear facilities, one from NNSA and one from ESE, and schedule remaining reviews to be performed at all levels.

Lead Responsibility:	NA-1 and US-ESE
Deliverable:	Reports from ISM verifications and schedule for remaining reviews
Due Date:	July 2006

Integration with ISM system

This topic is clearly focused on improving consistency and completeness of implementation of all ISM Functions.

6.0 ORGANIZATION AND MANAGEMENT

This is a major implementation plan and a high priority for the Department. The Associate Deputy Secretary, Dr. Bruce Carnes, has been designated by the Secretary as the DOE responsible manager for this plan. The 2004-1 Project Team has been established to coordinate overall execution of this plan. Ms. Kim Davis has been designated the Project Team Leader. The project team includes members from NNSA, EM, and EH, and other affected programs, and additional members bringing field experience, technical experience, and continuity from the 2004-1 plan development effort. The team will establish points of contact at each affected program office and site office.

Roles and Responsibilities

The 2004-1 team has the following responsibilities:

- Coordinate overall implementation of the Department's 2004-1 implementation plan.
- Complete assigned commitments, working with affected organizations and obtaining necessary concurrences from affected program offices.
- Monitor plan commitments and provide assistance and feedback to keep plan commitments on schedule and consistent with the planned objectives.
- Review all 2004-1 implementation plan deliverables for completeness and consistency, and provide input and recommendations to the responsible commitment managers.
- Communicate regularly with affected headquarters and site offices regarding the status of plan activities and expectations for near-term activities in support of plan implementation.
- Identify and resolve cross-cutting issues affecting plan implementation.
- Keep the executive leaders informed of overall plan performance and any issues that need senior management attention and direction.

6.1 Change Control

Complex, long-range plans require sufficient flexibility to accommodate changes in commitments, actions, or completion dates that may be necessary due to additional information, improvements, or changes in baseline assumptions.

The Department's policy is to: (1) provide prior written notification to the Board on the status of any plan commitment that will not be completed by the planned milestone date, (2) have the Secretary approve all revisions to the scope and schedule of plan commitments, and (3) clearly identify and describe the revisions and bases for the revisions. Fundamental changes to the plan's strategy, scope, or schedule will be provided to the Board through formal revision and reissuance of the plan. Other changes to the scope or schedule of planned commitments will be formally submitted in appropriate correspondence approved by the Secretary, along with the basis for the changes and appropriate corrective actions.

6.2 Reporting

To ensure the various Department implementing elements and the Board remain informed of the status of plan implementation, the Department's policy is to provide progress reports to the Board and/or Board staff. The Department will provide briefings to the Board and/or Board staff approximately every 4 months.

Commitment 28: The Department will provide periodic status briefings to the Board. These briefings will include updates on the status of completing actions identified in the various reviews and assessments indicated in this plan.

Lead Responsibility: 2004-1 Implementation Plan Responsible Manager or designee

Deliverable: Briefings

Due Date: September 2005, and approximately every four months thereafter

Commitment 29: The Department will provide an annual summary of activities performed in accordance with the 2004-1 Implementation Plan.

Lead Responsibility: 2004-1 Implementation Plan Responsible Manager or designee

Deliverable: Annual summary, provided to the Board, covering the previous 12 months of activities ending in June.

Due Date: July 2006 (and annually thereafter)

Table 1: Summary of Implementation Plan Commitments and Deliverables/Milestones

Number	Commitment	Deliverable	Due Date	Responsibility
1	Formally establish the CTAs.	Secretarial memo identifying the CTAs and their roles and responsibilities.	Completed - April 26, 2005	Secretary of Energy
2	Provide adequate technical support for the CTAs.	Letter report from each of the two CTAs to the Secretary declaring the CTA has adequate technical support and providing the basis for this declaration.	January 2006 (NNSA); April 2006 (ESE)	Central Technical Authorities
3	Fully implement the CTA function.	Letter report from from each of the two CTAs to the Secretary declaring the CTA function fully implemented and providing the basis for this declaration (NNSA report requires NNSA Administrator's concurrence).	Twelve months after providing adequate technical support to the CTAs, per Commitment 2 [January/April 2007]	Central Technical Authorities
4	Issue DOE Policy and Order on Oversight.	A. DOE Policy 226.1 on Oversight, approved and issued by the Secretary B. DOE Order 226.1 on Oversight, approved and issued by the Secretary	A. June 2005 B. June 2005	OA-1 OA-1

Number	Commitment	Deliverable	Due Date	Responsibility
5	Issue DOE Safety Oversight Manual.	A. Draft DOE Safety Oversight Manual. B. Approved DOE Safety Oversight Manual	A. July 2006 B. Three months after draft Manual is provided for Board review and comment (per Commitment 5A). [September 2006]	EH-1
6	Formally establish the nuclear safety research function.	Secretarial memo identifying the roles and responsibilities of the nuclear safety research function.	Completed - April 26, 2005	Secretary of Energy
7	Provide adequate processes and technical capabilities for the nuclear safety research function.	A. Letter report to the Secretary declaring that adequate processes are in place and agreed upon and providing the basis for this declaration. B. Letter report to the Secretary declaring that adequate technical capabilities are available and providing the basis for this declaration.	A: Six months after formally establishing the nuclear safety research function, per Commitment 6. [October 2005] B: Nine months after formally establishing the nuclear safety research function, per Commitment 6. [January 2006]	EH-1

Number	Commitment	Deliverable	Due Date	Responsibility
8	Fully implement the nuclear safety research function.	Letter report to the Secretary declaring the nuclear safety research function fully implemented and providing the basis for this declaration.	Twelve months after providing adequate processes and technical capabilities for nuclear safety research function, per Commitment 7. [January 2007]	EH-1

Number	Commitment	Deliverable	Due Date	Responsibility
9	Define and implement the process and criteria for delegating authorities to field personnel for fulfilling assigned safety responsibilities, and for performing periodic self-assessments on assignment of responsibilities and authorities to headquarters personnel.	A. Process definition and criteria, approved by the Deputy Secretary. B. Report to the Secretary on review activities to evaluate implementation of the processes and criteria for delegating authorities to field personnel for fulfilling safety responsibilities, and to determine whether all existing delegations of authority to the DOE Field Offices have been and are being made using these new processes and criteria. C. Approved biennial (every 2 years) program office self-assessments of safety function assignment at the program office level.	A. September 2005 B. February 2006 C. Twelve months after issuance of the process and criteria definition for HQ responsibilities self-assessment [September 2006]	A. NA-1 and US-ESE B. CTAs C. NA-1 and US-ESE

Number	Commitment	Deliverable	Due Date	Responsibility
10	Develop and implement QAPs as required by DOE O 414.1C, "Quality Assurance."	A. Approved HQ program office QAPs, with approved paths forward and schedules for achieving full implementation, including revision and implementation of field element QAPs. B. Approved Field Element QAPs.	A. November 2005 B. Completion in accordance with schedules provided in Commitment 10A.	NA-1, US-ESE and EH-1
11	DOE will identify highly qualified and experienced personnel who will assist the Department in improving overall technical capability.	A report identifying high-qualified and experienced personnel in select functional areas and describing their roles in improving overall technical capability, as well as, a plan for implementing this concept and a mechanism for maintaining the list.	July 2005	Chairman, FTCP (as an agent for the Deputy Secretary)

Number	Commitment	Deliverable	Due Date	Responsibility
12	DOE will provide structured training (such as the Nuclear Executive Leadership Training) for safety professionals, senior managers and decision-makers responsible for nuclear safety, including those responsible for nuclear safety oversight.	A report describing the Nuclear Executive Leadership Training program, including the training materials, training periodicity, the criteria for and status of personnel identified for training, the date when all identified personnel will complete training, an assessment of the training's effectiveness, and plans for fully developing the Department's training and professional development program.	August 2005	NA-1 and US-ESE
13	The FTCP will develop corrective actions to improve recruiting, developing, training, qualifying, maintaining proficiency, and retaining technical personnel, as well as FTCP effectiveness. The corrective action plan will include a prioritized list of key positions that should be filled to enhance safety.	Corrective Action Plan, approved and issued by the Deputy Secretary.	August 2005	Chairman, FTCP

Number	Commitment	Deliverable	Due Date	Responsibility
14	DOE will commission an emeritus-level panel to review the Department's efforts for recruiting, developing, retaining, and rewarding technically excellent personnel to fulfill safety responsibilities, evaluate associated organizational systems and impediments, evaluate the FTCP's effectiveness, and make recommendations to the Secretary for improving the Department's effectiveness in the areas reviewed.	Report to the Secretary.	September 2006	Deputy Secretary
15	DOE will complete technical staffing of the personnel placed in identified positions needed to perform the federal safety assurance function for nuclear facilities.	A report on completed DOE staffing actions, with status of technical qualifications.	December 2006	Deputy Secretary
16	Verify Federal Safety Assurance Capability (IP Section 5.1).	Report to the Secretary.	Twelve months following completion of Commitment #3 [January 2008]	OA-1
17	Complete Department-wide formal review of Columbia and Davis-Besse events, and develop consolidated Department-wide Action Plan.	Consolidated Department-wide Action Plan, approved and issued by the Deputy Secretary, and describing who will determine that corrective actions have been effective.	July 2005	Deputy Assistant Secretary for Corporate Performance Assessment (EH-3)

Number	Commitment	Deliverable	Due Date	Responsibility
18	Develop Comprehensive DOE Operating Experience Program.	DOE Directive on Operating Experience, approved and issued by the Deputy Secretary, along with implementation direction and a schedule to complete implementation.	January 2006	EH-1
19	Demonstrate Performance of DOE Operating Experience Program.	Line oversight review reports on the implementation of the operating experience program at the line program's sites.	Eighteen months after issuance of the DOE directive on Operating Experience, per Commitment 18. [July 2007]	Applicable Program Secretarial Officers and Field Element Managers
20	Verify effectiveness of implementation of implementation plan sections 5.2.1 and 5.2.2.	Verification report to the Secretary of Energy.	Four months following completion of both Commitment 19 and the actions defined in the Department's Action Plan for Columbia and Davis Besse events in Commitment 17.	OA-1

Number	Commitment	Deliverable	Due Date	Responsibility
21	Describe a path forward for linking HRO attributes with existing ISM principles and functions, and describe how these attributes will be incorporated in the Department's guidance directives.	A. DOE reaffirmation of ISM and draft statement linking ISM with HRO attributes, approved by the Secretary of Energy B. Letter from the 2004-1 responsible manager to the Board providing the Department's decision and basis on whether to issue the Appendix F ISM vision as a complementary ISM Policy or Notice.	A. Complete – See Cover Letter and Appendix F B. July 2005	2004-1 Implementation Team

Number	Commitment	Deliverable	Due Date	Responsibility
22	Issue and implement expectations for DOE organizations regarding ISM implementation.	A. A draft set of expectations for DOE ISM system descriptions for DOE headquarters and field organizations. B. New DOE manual on ISM, institutionalizing DOE expectations, issued for use. C. Approved DOE ISM system descriptions for DOE headquarters and field organizations.	A. Complete – See Appendix G B. December 2005 C. For Headquarters programs ISM system descriptions, 3 months after issuance of the approved ISM Manual per Commitment 22B [March 2006]; for field office ISM system descriptions, 8 months after issuance of the approved ISM Manual per Commitment 22B [August 2006]	A. NA-1 and US-ESE B. EH-1 C. NA-1 and US-ESE and EH-1
23	Develop site office action plans to improve work planning and work control.	Action plans, approved by field elements and HQ program office.	February 2006	NA-1 and US-ESE
24	Perform HQ line oversight on work planning and work control.	Headquarters oversight reports, in accordance with approved CRADs.	Eighteen months following approval of site office action plans, per Commitment 23 [August 2007]	NA-1 and US-ESE

Number	Commitment	Deliverable	Due Date	Responsibility
25	Develop site office action plans to improve feedback and improvement core element performance.	Site office action plans to improve "feedback and improvement" core element performance	February 2006	NA-1 and US-ESE
26	Review the implementation of "feedback and improvement" core element through disciplined line management oversight program, and provide both a summary status report to the Secretary and mid-course direction to direct reports on improving the institutionalization of ISM into the annual Departmental planning.	Report to the Secretary and direction to direct reports.	March 2007	NA-1 and US-ESE
27	Complete comprehensive (HQ program offices, sites, contractors) ISM reviews at two major sites with defense nuclear facilities, one from NNSA and one from ESE, and schedule remaining reviews to be performed at all levels.	Reports from ISM verifications and schedule for remaining reviews.	July 2006	NA-1 and US-ESE
28	The Department will provide periodic status briefings to the Board. These briefings will include updates on the status of completing actions identified in the various reviews and assessments indicated in this plan.	Briefings.	September 2005, and approximately every four months thereafter	2004-1 Implementation Plan Responsible Manager or designee

Number	Commitment	Deliverable	Due Date	Responsibility
29	The Department will provide an annual summary of activities performed in accordance with the 2004-1 Implementation Plan.	Annual summary, provided to the Board, covering the previous 12 months of activities ending in June.	July 2006 (and annually thereafter)	2004-1 Implementation Plan Responsible Manager or designee

Appendix A: List of Acronyms

CAIB – NASA Columbia Accident Investigation Board

CAP – Corrective Action Plan

CDNS - Chief of Defense Nuclear Safety

CENS – Chief of ESE Nuclear Safety

CRAD – Criteria and Review Approach Document

CTA – Central Technical Authority

CSO – Cognizant Secretarial Officer

DOE – Department of Energy

DS – Deputy Secretary

EM – Environmental Management

EH – Environment, Safety and Health

ESE – Energy, Science and Environment

FRA – Functions, Responsibilities and Authorities

FRAM – Functions, Responsibilities and Authorities Manual

FTCP – Federal Technical Capability Panel

HRO – High Reliability Organization

INPO – Institute of Nuclear Power Operations

ISM – Integrated Safety Management

M – Manual

NASA (or NA) – National Aeronautics and Space Administration

NE – Nuclear Energy

NNSA (or NA) – National Nuclear Security Administration

NRC – Nuclear Regulatory Commission

O – Order

OA – Office of Independent Oversight and Performance Assurance

OPI – Office of Primary Interest

P – Policy

PMP – Project Management Plan

PSO – Program Secretarial Officer

QA – Quality Assurance

QAP – Quality Assurance Program

SC – Office of Science

US – Under Secretary

Appendix B: Glossary of Terms

High Reliability Organizations - Organizations that consistently operate under trying and hazardous conditions, and manage to have relatively few accidents. These organizations operate in settings where the potential for error and disaster is very high. They have no choice but to function reliably because failure results in severe consequences. HRO theory holds that significant accidents can be prevented through proper management of prevention and mitigation activities. Examples of high-reliability organizations: nuclear aircraft carriers, nuclear power generating plants, power grid dispatching centers, air traffic control systems, aircraft operations, hospital emergency departments, hostage negotiating teams, firefighting crews, continuous processing firms.

Integrated Safety Management System - To prevent organizational accidents, the Department of Energy has developed a comprehensive safety management system – the Integrated Safety Management system – based on a set of safety requirements and standards, detailed safety analyses to identify hazards and controls, robust design and administrative controls for identified hazards, a technical qualification program, detailed work planning, operational readiness certifications, a strong occurrence reporting system, extensive performance monitoring and reviews, and independent oversight. Sustained vigilance is required for an effective ISM system.

Organizational Accidents - Organizational accidents often involve a complex combination of individual errors, human-machine interface difficulties, latent weaknesses in designed hardware or administrative controls, and programmatic weaknesses that allowed these latent defense weaknesses to be created and sustained without detection. Complex technologies vulnerable to organizational accidents include nuclear power plants, commercial aviation, petrochemical industry, chemical process plants, marine and rail transport, banks and stadiums. Most accidents originate from or are propagated by latent failures – loopholes in the system's defenses, barriers, and safeguards whose potential existed unobserved for some time prior to the onset of the accident sequence. These loopholes consist of imperfections in features such as leadership/supervision, training and qualification, report of defects, engineered safety features, safety procedures, and hazard identification and evaluation. Some illustrative examples of organizational accidents are listed below:

- USS Thresher Nuclear Submarine (1963)
- NASA Apollo 1 Fire (1967)
- Flixborough, UK Petrochemical Explosion (1974)
- Three Mile Island Nuclear Station (1979)
- Bhopal, India (1984)
- NASA Challenger Space Shuttle (1986)
- Chernobyl Nuclear Power Plant, Ukraine (1986)
- Explosion on the Piper Alpha Oil Platform (1988)
- Exxon Valdez runs aground (1989)

- Davis-Besse Reactor Vessel Head Incident (2002)
- NASA Columbia Space Shuttle (2003)

Differences between individual and organizational accidents are summarized below:

Individual Accidents	Organizational Accidents
A specific individual or group is the agent of the accident.	Have Multiple Causes, involving many operating at different levels of the respective organizations
The agent of the accident is usually also the main victim of the accident. Consequences may be great to those involved, but they are limited.	Consequences can be catastrophic. Organizational accidents can have devastating effects on uninvolved populations, assets, and the environment.
The frequency is moderate. Within the DOE complex, serious individual accidents typically occur each year.	The frequency of organizational accidents is rare or extremely rare. Some possible organizational accidents are considered unacceptable – to be avoided at all costs.
Nature of individual accidents has remained relatively unchanged over recent years.	Organizational accidents – a product of technological innovations – have become more prevalent in recent years as technologies have gotten more complex.

Normalization of Error (also Normalization of Deviation) - The tendency to redefine and accept previously-unexpected anomalies over time as expected events and ultimately as acceptable risks. Diane Vaughan developed this term based on her study of the O-ring failures in the Challenger accident. In this accident, "the range of expected error enlarged from the judgment that it was normal to have heat on the primary O-ring, to normal to have erosion on the primary O-ring, to normal to have gas blowby, to normal to have blowby reaching the secondary O-ring, and finally to the judgment that it was normal to have erosion on the secondary O-ring."

Nuclear Facility – A reactor or a nonreactor nuclear facility where an activity is conducted for or on behalf of DOE and includes any related area, structure, facility, or activity to the extent necessary to ensure proper implementation of the requirements established by 10 CFR 830. [10 CFR 830]

Safety Culture - The safety culture of an organization is the product of individual and group values, attitudes, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization's health and safety programs. Organizations with a positive safety culture are characterized by communications founded on mutual trust, by shared perceptions of the importance of safety, and by confidence in the efficacy of preventive measures. The term safety culture entered public awareness through the vocabulary of nuclear safety after the Chernobyl nuclear power plant explosion.

Appendix C: Cross-Walk to Recommendation

TOPIC AREA	Board Recommendation 2004-1 (May 21, 2004)	Secretary's Response Letter (July 21, 2004)	Department's 2004-1 Implementation Plan
Delegations of Authority	*"The Board recommends: 1. That delegation of authority for nuclear safety matters to field offices and contractors be contingent upon the development and application of criteria and implementing mechanisms to ensure that:"*	*The Department will: "1. Clarify and/or establish formal requirements regarding delegation of authority on safety matters to ensure that delegations are made with clear criteria. …"*	**Section 5.1.4**, Strengthening Federal Safety Assurance - Establishing Clear Roles, Responsibilities, and Authorities
Oversight	*"(a) oversight responsibility includes the capability for examining, assessing, and auditing by all levels of the DOE organization,"*	*The Department will: "1. … Ensure that adequate oversight [is] in place to fulfill these safety responsibilities at all levels of the Department."*	**Section 5.1.2**, Strengthening Federal Safety Assurance - Providing Effective Federal Oversight
Technical Capability	*"(b) the technical capability and appropriate experience for effective safety oversight is in place, and"*	*The Department will: "1. … Ensure that technical capability [is] in place to fulfill these safety responsibilities at all levels of the Department."*	**Section 5.1.5**, Strengthening Federal Safety Assurance - Ensuring Technical Capability and Capacity to Fulfill Safety Responsibilities
Operating Experience Program	*"(c) corrective action plans consistent with recommendations resulting from internal DOE and NNSA reviews of the Columbia accident and the Davis-Besse incident are issued."*	*The Department will: "2. Identify applicable lessons from the Columbia accident and Davis-Besse incident and implement corrective actions to improve safety throughout the organization."*	**Section 5.2**, Learning from Operating Experience
Central Technical Authority	*"2. That to ensure that any features of the proposed changes will not increase the likelihood of a low-probability, high-consequence nuclear accident, DOE and NNSA take steps to: (a) empower a central and technically competent authority responsible for operational and nuclear safety goals, expectations, requirements, standards, directives, and waivers;*	*The Department will: "3. Establish a technically-competent, central authority or authorities with core safety responsibilities."*	**Section 5.1.1**, Strengthening Federal Safety Assurance - Instituting a Central Technical Authority (CTA)
Nuclear Safety	*"(b) ensure the continued integration and support of*	*The Department will: "4. Identify safety research,*	**Section 5.1.3**, Strengthening Federal Safety Assurance -

Research Program	*research, analysis, and testing in nuclear safety technologies;"*	*analysis, and testing needs and institute a program to ensure effective management, integration, and execution of efforts to address these needs."*	Instituting a Nuclear Safety Research Program
Integrated Safety Management	*"(c) require that the principles of Integrated Safety Management serve as the foundation of the implementing mechanisms at the sites."*	*Second Paragraph: "The Department remains firmly committed to its Integrated Safety Management (ISM) program as the foundation for performing work safely throughout the Department. The Department's response will include actions to enhance the effectiveness of our ISM program."*	**Section 5.3**, Revitalizing Integrated Safety Management Implementation
FRAs and QAPs	*"3. That direct and unbroken line of roles and responsibilities for the safety of nuclear operations—from the Secretary of Energy and the NNSA Administrator to field offices and sites—be insured according to appropriate Functions, Responsibilities, and Authorities documents and Quality Assurance Implementation Plans."*	*The Department will: "5. Revise and implement the Functions, Responsibilities and Authorities documents and Quality Assurance Plans, as needed, to achieve the actions described above and to ensure direct and unbroken lines of roles and responsibilities for the safety of nuclear operations."*	**Section 5.1.4**, Strengthening Federal Safety Assurance - Establishing Clear Roles, Responsibilities, and Authorities [with additional actions throughout the plan]
Verification	*"4. That prior to final delegation of authority and responsibility for defense nuclear safety matters to the field offices and contractors, DOE and NNSA Program Secretarial Officers provide a report to the Secretary of Energy describing the results of actions taken in conformance with the above recommendations."*	*The Department will: "6. Validate that safety responsibilities, capabilities, and authorities are implemented and consistent with requirements."*	**Section 5.1.4**, Strengthening Federal Safety Assurance - Establishing Clear Roles, Responsibilities, and Authorities [with additional actions throughout the plan] **Section 5.3.4**, Revitalizing Integrated Safety Management Implementation – Verification [with additional actions throughout the plan]

Appendix D: Board Recommendation 2004-1

[DNFSB LETTERHEAD]

May 21, 2004

The Honorable Spencer Abraham
Secretary of Energy
1000 Independence Avenue, SW
Washington, DC 20585-1000

Dear Secretary Abraham:

On May 21, 2004, the Defense Nuclear Facilities Safety Board (Board), in accordance with 42 U.S.C. § 2286d(a), unanimously approved Recommendation 2004-1, which is enclosed for your consideration. Recommendation 2004-1 deals with Oversight of Complex, High-Hazard Nuclear Operations.

After your receipt of this recommendation and as required by 42 U.S.C. § 2286d(a), the Board will promptly make it available to the public. The Board believes that the recommendation contains no information that is classified or otherwise restricted. To the extent this recommendation does not include information restricted by DOE under the Atomic Energy Act of 1954, 42 U.S.C. §§ 2161-68, as amended, please see that it is promptly placed on file in your regional public reading rooms. The Board will also publish this recommendation in the *Federal Register*.

Sincerely,

John T. Conway
Chairman

Enclosure

c: Mr. Mark B. Whitaker, Jr.

DEFENSE NUCLEAR FACILITIES SAFETY BOARD
RECOMMENDATION 2004-1 TO THE SECRETARY OF ENERGY
Pursuant to 42 U.S.C. § 228a(a)(5)
Atomic Energy Act of 1954, As amended.

Dated: May 21, 2004

In furtherance of its statutory duty to oversee the Department of Energy's (DOE) protection of workers and the public from hazards at defense nuclear facilities operated for DOE and the National Nuclear Safety Administration (NNSA), the Defense Nuclear Facilities Safety Board (Board) conducted eight public hearings to examine DOE's current and proposed methods of ensuring safety at its defense nuclear facilities.

In these hearings, the Board also sought to benefit from the lessons learned as a result of investigations conducted following the Columbia Space Shuttle disaster and the discovery of the deep corrosion in the reactor vessel head at the Davis-Besse Nuclear Power Plant. The Board received testimony from representatives of the Nuclear Regulatory Commission; the Naval Reactors Program; the Columbia Accident Investigation Board; the Deputy Secretary of Energy; the Administrator of NNSA; DOE's Under Secretary of Energy, Science and Environment; DOE's Assistant Secretary for Environment, Safety, and Health; and selected site managers of DOE's facilities, senior contractor managers, and members of the public.

The overall objective of the hearings was to gather information that could be helpful in assessing DOE's proposals for changing the methods it uses for contract management and nuclear safety oversight, as they have been controlled through the DOE Directives System. NNSA has proposed shifting responsibility for safety oversight from DOE Headquarters to the DOE field offices and site contractors. The key question the Board sought to address was: Will modifications proposed by DOE/NNSA to organizational structure and practices, as well as increased emphasis on productivity, improve or reduce safety, and increase or decrease the possibility of a high-consequence, low-probability nuclear accident?

DOE's programs for national security and environmental protection are complex, with potentially high consequences if not safely performed. Mishandling of nuclear materials and radioactive wastes could result in unintended nuclear criticality, dispersal of radioactive materials, and even nuclear detonation. DOE has a long and successful history of nuclear operations, during which it has established a structure of requirements directed to achieving nuclear safety. That structure is based on such methods as defense in depth, redundancy of protective measures, robust technical competence in operations and oversight, extensive research and testing, a Directives System embodying nuclear safety requirements, Integrated Safety Management, and processes to ensure safe performance.

The United States owns the defense nuclear facilities at which its programs are carried out by a government agency—DOE. Each such facility is operated by a contractor that was selected by DOE on the basis of being best suited to conduct the work for DOE at that site.

Under the original Atomic Energy Act of 1946 and continuing to date in the Atomic Energy Act of 1954, as amended, the government officials in charge (i.e., the Secretary of Energy and other line officers) have a statutory responsibility to protect health and minimize danger to life or property. In any delegation of responsibility or authority to lower echelons of DOE or to contractors, the highest levels of DOE continue to retain safety responsibility. While this responsibility can be delegated, it is never ceded by the person or organization making the delegation. Contractors are responsible to DOE for safety of their operations, while DOE is itself responsible to the President, Congress, and the public.

This reality was highlighted during the course of the Board's hearings. Many important lessons were cited in the testimony provided. These included the importance of a centralized and technically competent oversight authority, central control of technical safety requirements and waivers for departure from those requirements, an ability to operate in a decentralized mode when appropriate, a willingness to accept criticisms, the need for retention of technical expertise and capabilities at high levels of any organization in which technical failure could have high consequences, and an awareness that complacency can arise from a history of successes. DOE representatives testified that DOE's attention to safety has continued to improve with better on-site oversight and self-assessment programs, use of Integrated Safety Management, careful attention to safety statistics, and stabilization and disposal of high risk nuclear materials. However, cause for concern with regard to the potential increase in the possibility of nuclear accidents was also evident in: (1) the increased emphasis on productivity at the possible expense of safety, (2) the loss of technical competency and understanding at high levels of DOE's and NNSA's organizational structure, (3) the apparent absence of a strong safety research focus, and (4) the reduced central oversight of safety.

Clearly, safety performance can benefit from attention to detail and lessons learned from small incidents and minor accidents. However, failures leading to high-consequence, low-probability accidents would likely have their roots in interactions between engineering failures and improper human actions. Because the consequences of large nuclear accidents would be unacceptable, the nuclear weapons complex cannot permit them to occur. While the potential for such accidents cannot be completely eliminated, their likelihood can be held to an insignificant level by rigorous attention to Integrated Safety Management with technical and operational excellence based on nuclear safety standards subject to rigorous oversight. In addition, nuclear safety must be founded on solid research, analysis, and testing to ensure an adequate understanding of energetic initiating mechanisms under off-normal conditions.

DOE has taken some preliminary steps toward its proposed changes in safety practices. These actions may have contributed to some unfortunate consequences, such as the following:

- A glovebox fire occurred at the Rocky Flats closure site, where, in the interest of efficiency, a generic procedure was used instead of one designed to identify and control specific hazards. Apparently, success of the cleanup project resulted in management complacency. DOE site management had given the impression that safety was less

important than progress, and contract management had not emphasized oversight of work control processes.

- Downsizing of safety expertise has begun in NNSA's NA-53 organization, while field organizations such as the Albuquerque Service Center have not developed an equivalent technical capability in a timely manner. As a result, NNSA field offices are left without an adequate depth of understanding of such important matters as seismic analysis and design, training of nuclear workers, and protection against unintended criticality.

- DOE's Office of Environmental Safety and Health, with assistance from some sites and contractors, has reviewed DOE Directives to simplify safety requirements, with the objective of supporting accelerated operations that are also more efficient. This shift has led to proposals for downgrading some worker safety Directives to the level of guidance and modifying some radiation protection requirements. It has also led to a proposed modification of the Order on Worker Safety and Health to reduce requirements for protecting workers from the consequences of fires, explosions, and discharges from high-pressure systems.

Proposed modifications to DOE and NNSA's organizational structure, manpower, contract management, oversight policies and practices, and safety directives could have unintended consequences. These include reduction of defense in depth, potentially inconsistent safety-related decisions caused by decentralization of safety authority, emphasis on performance as opposed to safety, and reduction of technical capability at key points in the organizational structure. DOE and NNSA line managers could be left with inadequate awareness of safety issues.

As a result of testimony it has received, the Board is not convinced of the benefit of the changes to DOE's and NNSA's organizational structure and practices as they have been described. The Board cautions that if any such changes are made, they must be done formally and deliberatively, with due attention given to unintended safety consequences that could reduce the present high level of nuclear safety. DOE should take full advantage of lessons learned from safety problems discovered by National Aeronautic Space Administration and Nuclear Regulatory Commission, and it should learn from the success of the good organizational and safety practices championed by the Naval Reactors Program. The Board needs to be sure that any fundamental reorganization does not degrade nuclear safety, and that the likelihood of a serious accident, facility failure, construction problem, or nuclear incident will not be increased as a result of well-intentioned changes.

As a result of testimony received at the public hearings and the potential effects on safety at defense nuclear facilities outlined above, the Board recommends:

1. That delegation of authority for nuclear safety matters to field offices and contractors be contingent upon the development and application of criteria and implementing mechanisms to ensure that:

a. oversight responsibility includes the capability for examining, assessing, and auditing by all levels of the DOE organization,

b. the technical capability and appropriate experience for effective safety oversight is in place, and

c. corrective action plans consistent with recommendations resulting from internal DOE and NNSA reviews of the Columbia accident and the Davis-Besse incident are issued.

2. That to ensure that any features of the proposed changes will not increase the likelihood of a low-probability, high-consequence nuclear accident, DOE and NNSA take steps to:

   a. empower a central and technically competent authority responsible for operational and nuclear safety goals, expectations, requirements, standards, directives, and waivers;

   b. ensure the continued integration and support of research, analysis, and testing in nuclear safety technologies; and

   c. require that the principles of Integrated Safety Management serve as the foundation of the implementing mechanisms at the sites.

3. That direct and unbroken line of roles and responsibilities for the safety of nuclear operations—from the Secretary of Energy and the NNSA Administrator to field offices and sites—be insured according to appropriate Functions, Responsibilities, and Authorities documents and Quality Assurance Implementation Plans.

4. That prior to final delegation of authority and responsibility for defense nuclear safety matters to the field offices and contractors, DOE and NNSA Program Secretarial Officers provide a report to the Secretary of Energy describing the results of actions taken in conformance with the above recommendations.

John T. Conway, Chairman

Appendix E: Secretary's Response Letter to Board Recommendation 2004-1

[SOE LETTERHEAD]

July 21, 2004

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW, Suite 700
Washington, DC 20004-2901

Dear Mr. Chairman:

The Department has thoroughly reviewed Recommendation 2004-1 regarding oversight of complex, high-hazard nuclear operations issued by the Defense Nuclear Facilities Safety Board (Board) on May 21, 2004.

The Department remains firmly committed to its Integrated Safety Management (ISM) program as the foundation for performing work safely throughout the Department. The Department's response will include actions to enhance the effectiveness of our ISM program. We remain committed to safety as our top priority and will not sacrifice safety to meet production goals. In January, we highlighted our commitment to continued safety improvement by establishing safety as one of the seven Department-wide Management Challenges for 2004.

As you observed as background to the recommendation, the Columbia accident and the Davis-Besse incident provide valuable lessons from which the Department can learn as we continue to improve our safety management. The lessons from these events will be key inputs in our action planning in response to your recommendation.

The Department accepts Recommendation 2004- 1 and will develop an implementation plan to accomplish the following actions for nuclear operations at defense nuclear facilities:

1. Clarify and/or establish formal requirements regarding delegation of authority on safety matters to ensure that delegations are made with clear criteria. Ensure that adequate oversight and technical capability are in place to fulfill these safety responsibilities at all levels of the Department.

2. Identify applicable lessons from the Columbia accident and Davis-Besse incident and implement corrective actions to improve safety throughout the organization.

3. Establish a technically-competent, central authority or authorities with core safety responsibilities.

4. Identify safety research, analysis, and testing needs and institute a program to ensure effective management, integration, and execution of efforts to address these needs.

5. Revise and implement the Functions, Responsibilities and Authorities documents and Quality Assurance Plans, as needed, to achieve the actions described above and to ensure direct and unbroken lines of roles and responsibilities for the safety of nuclear operations.

6. Validate that safety responsibilities, capabilities, and authorities are implemented and consistent with requirements.

The Department's understanding is that Recommendation 2004-1 does not require changes to the structure of the directives management system or to the existing DEAR clauses.

Regarding delegations of authority on defense nuclear safety matters, I have directed the Department's senior managers to make no new field delegations, except as approved by me or the Deputy Secretary until the Department completes the applicable actions identified in the Department's 2004-1 implementation plan. To clarify, this restriction does not apply to delegation modifications that may be required as a result of personnel changes or delegation expirations.

I have asked Mr. Ted Sherry, Deputy Manager, National Nuclear Security Administration Y-12 Site Office, to lead the response team that will develop the Department's 2004-1 implementation plan. If you have questions, please contact him at (865) 576-0752.

Sincerely,

Spencer Abraham

Appendix F: Requisite Environment for Effective Implementation of Integrated Safety Management (ISM) Systems

Requisite Environment for Effective Implementation of Integrated Safety Management (ISM) Systems

June 2005

DRAFT

* Safety encompasses environment, safety and health, including pollution prevention and waste minimization.

Background

In 1996, the Department defined the Integrated Safety Management (ISM) system as its programmatic framework for accomplishing work safely. Nine years of implementation experience have proven that ISM is a fundamentally sound safety management approach with broad applicability. The ISM concept is also well supported by Department personnel and contractors. The Department remains committed to ISM as its enduring framework for performing work safely.

Over the past year, the Department has recognized and acknowledged the need to revitalize ISM implementation. This need to revitalize or reinvigorate ISM is due to two factors: (1) incompleteness and inconsistencies in implementing ISM principles and functions in programs, sites, offices, and facilities throughout the complex, and (2) a general waning of attention to and use of ISM as it was intended to create and sustain real continuous improvement.

To address inconsistencies in implementation, the Department has targeted three long-recognized weaknesses for renewed attention: (1) work planning and control, (2) feedback and improvement processes, and (3) ISM system description and implementation by DOE federal organizations. To help reinvigorate the use of ISM as the guiding framework for organizational performance improvement, this paper seeks to clearly describe the context or environment within which ISM must operate to be effective. With this vision, leaders throughout the organization can direct efforts to create the necessary environment for effective ISM implementation and, ultimately, positive culture change that supports safe, and highly productive operations.

Introduction

This paper seeks to clearly describe and articulate the attributes – expected, observable behaviors – typical of the total environment within which ISM must be implemented to be fully effective. Leaders need to implement appropriate change strategies to make these behaviors recognizable and typical in their work environments. Achieving these desired work behaviors will result greater productivity as well as improved safety.

Within the ISM hierarchy, it is the ISM principles that describe the environment or context for work activities, in that, most ISM principles apply to each and every ISM function. Experience and research with safety cultures and high-reliability organizations (HRO) over the past ten or more years have raised new insights and deeper understanding relevant to the desired work environment for effective safety management. An analysis of this experience and research over the past decade has identified 4 supplemental high-reliability principles that are necessary to focus attention and action in the right direction to create the desired ISM environments. These principles also promote a mature shift from a compliance orientation toward an excellence orientation. They emphasize continuous improvement and long-term performance, and are entirely consistent with the original intents of ISM. As the Department moves forward, the desired environment for effective ISM implementation is described by the 7 ISM guiding principles plus 4 supplemental high-reliability principles.

Guiding Principles for Integrated Safety Management

The Department has established the following principles to guide implementation of Integrated Safety Management (ISM) systems.

1. **Line Management Responsibility for Safety.** *Line management is directly responsible for the protection of the public, the workers, and the environment.*

2. **Clear Roles and Responsibilities.** *Clear and unambiguous lines of authority and responsibility for ensuring safety shall be established and maintained at all organizational levels within the Department and its contractors.*

3. **Competence Commensurate with Responsibilities.** *Personnel shall possess the experience, knowledge, skills, and abilities that are necessary to discharge their responsibilities.*

4. **Balanced Priorities.** *Resources shall be effectively allocated to address safety, programmatic, and operational considerations. Protecting the public, the workers, and the environment shall be a priority whenever activities are planned and performed.*

5. **Identification of Safety Standards and Requirements.** *Before work is performed, the associated hazards shall be evaluated and an agreed-upon set of safety standards and requirements shall be established which, if properly implemented, will provide adequate assurance that the public, the workers, and the environment are protected from adverse consequences.*

6. **Hazard Controls Tailored to Work Being Performed.** *Administrative and engineering controls to prevent and mitigate hazards shall be tailored to the work being performed and associated hazards.*

7. **Operations Authorization.** *The conditions and requirements to be satisfied for operations to be initiated and conducted shall be clearly established and agreed upon.*

Note: The ISM functions describe the specific work activities that must be accomplished, and these are not explicitly addressed by this paper: (1) define the work, (2) identify and analyze the hazards, (3) identify and implement the controls, (4) perform work safely within controls, and (5) feedback and improvement. It is vitally important that each organizational element effectively implement these five core functions, beginning with accurately and completely defining its own work, even though the nature of the work may vary significantly across the total organization.

1. **Line Management Responsibility for Safety.** *Line management is directly responsible for the protection of the public, the workers, and the environment.*

Attributes:

- Line management (from the Secretary of Energy to the DOE cognizant Secretarial Officer to the DOE Site Office Manager to the Contractor Senior Manager to the front-line worker) understands and accepts their safety responsibilities inherent in mission accomplishment. Line management does not depend on supporting organizations to build safety into line management work activities.

- Line management has a clear understanding of its work activities and its performance objectives, and how it will conduct its work activities safely and accomplish its performance objectives.

- Leaders demonstrate commitment to safety. Executive and senior managers are the leading advocates of safety and demonstrate their commitment both in word and action.

- Organization leaders periodically take steps to reinforce safety, including personal visits and walkthroughs to verify that their expectations are being met.

- Organization leaders practice visible leadership in the field by placing "eyes on the problem," coaching, mentoring, and reinforcing standards and positive behaviors. Deviations from expectations are corrected promptly.

- Line management maintains a strong focus on the safe conduct of work activities.

- Line management maintains awareness of key performance indicators related to safe work accomplishment, watches carefully for adverse trends or indications, and takes prompt action to understand adverse trends and anomalies.

- Leaders throughout the organization set an example for safety through their direct involvement in continuous learning by themselves and their followers on topics related to technical understanding and safety improvement.

- Managers and supervisors are skilled in responding to employee questions in an open, honest manner. They encourage reporting of safety issues and errors. They do not discipline employees for the reporting of errors. They encourage a vigorous questioning attitude toward safety, and constructive dialogues and discussions on safety matters.

- Credibility and trust are present and continuously nurtured. Leaders reinforce perishable values of trust, credibility, and attentiveness.

- The organization is just. The system of rewards and sanctions is aligned with strong safety policies and reinforces the desired behaviors and outcomes.

2. **Clear Roles and Responsibilities.** *Clear and unambiguous lines of authority and responsibility for ensuring safety shall be established and maintained at all organizational levels within the Department and its contractors.*

Attributes:

- Responsibility and authority for safety are well defined and clearly understood as an integral part of performing work.
- Organizational safety responsibilities are sufficiently comprehensive to address the work activities and hazards involved.
- The line of authority and responsibility for safety is defined from the Secretary of Energy to the individual contributor. Each of these positions has clearly defined roles, responsibilities, and authorities, designated in writing and understood by the incumbent.
- Organizational Functions, Responsibilities, and Authorities documents are maintained current and accurate.
- Reporting relationships, positional authority, staffing levels and experience, processes and infrastructure, and financial resources are commensurate with and support safety responsibilities.
- All personnel understand the importance of adherence to safety standards.
- Line management oversight is provided to reinforce expectations and ensure that key safety responsibilities and expectations are being met.
- Personnel are held accountable at all levels of the organization for shortfalls in meeting standards and expectations related to fulfilling safety responsibilities. Accountability is demonstrated both by recognition of excellent safety performers as well as identification of less-than-adequate performers. In holding people accountable, managers consider individual intentions and the organizational factors that may have contributed.

3. **Competence Commensurate with Responsibilities.** *Personnel shall possess the experience, knowledge, skills, and abilities that are necessary to discharge their responsibilities.*

Attributes:

- People and their professional capabilities, experiences, and values are regarded as the organization's most valuable assets. The organization places a high priority on recruiting, selection, and retention of an excellent technical staff.

- The organization maintains a highly knowledgeable workforce to support a broad spectrum of operational and technical decisions. Technical and safety expertise is embedded in the organization. Outside expertise is employed when necessary.

- Individuals have in-depth understanding of safety and technical aspects of their jobs. Technical support personnel have expert-level technical understanding. Senior managers have strong technical backgrounds in their area of expertise.

- Assignments and delegations of safety responsibilities are made to individuals with the necessary technical experience and expertise. In rare cases, if this is not possible, corrective and compensatory actions are taken.

- The organization values and practices continuous learning, and requires employees to participate in recurrent and relevant training and educational experiences to improve knowledge, skills, and abilities. Professional and technical growth is formally supported and tracked to build organizational capability.

- Old models and practices are updated and refreshed based on new information and new understanding.

- Training effectively upholds management's standards and expectations. Beyond teaching knowledge and skills, trainers are adept at instilling requisite safety values and beliefs.

- Training to broaden individual capabilities and to support organizational learning is available and encouraged – to appreciate the potential for unexpected conditions; to recognize and respond to a variety of problems and anomalies; to understand complex technologies and capabilities to respond to complex events; to develop flexibility at applying existing knowledge and skills in new situations; to improve communications; to learn from significant industry and DOE events.

- Leaders set an example for safety through their personal commitment to continuous learning and by their direct involvement in high-quality training that consistently reinforces expected worker behaviors.

- Informal opinion leaders in the organization are encouraged to model safe behavior and influence peers to meet high standards.

4. **Balanced Priorities.** *Resources shall be effectively allocated to address safety, programmatic, and operational considerations. Protecting the public, the workers, and the environment shall be a priority whenever activities are planned and performed.*

Attributes:

- Organization leaders frequently and consistently communicate the safety message, both as an integral part of the mission and as a stand-alone theme.

- Leaders recognize that aggressive mission and production goals can appear to send mixed signals on the importance of safety. Managers are sensitive to detect and avoid these misunderstandings, or to deal with them effectively if they arise.

- The organization demonstrates a strong sense of mission and operational goals, including a commitment to highly reliable operations, both in production and safety. Safety and productivity are both highly valued.

- Safety and productivity concerns both receive balanced consideration in funding allocations and schedule decisions.

- Staffing levels and capabilities are consistent with expectation of maintaining safety and reliable operations.

- The organizational staffing provides sufficient depth and redundancy to ensure that all important safety functions are adequately performed.

- The organization is able to build and sustain a flexible, robust technical staff and staffing capacity. Pockets of resilience are established through redundant resources. The organization develops sufficient resources to rapidly cope and respond to unexpected changes.

- Key technical officials are assigned for long terms of service to provide institutional continuity and constancy regarding safety requirements and expectations. Organizational knowledge is valued and efforts are made to preserve it when key players move on.

- Systems of checks and balances are in place and effective at all levels of the organization to make sure that safety considerations are adequately weighed and prioritized.

- Safety and quality assurance positions have adequate organizational influence.

- Adequate resources are made available for safety upgrades and repairs to aging infrastructure. Modern infrastructure and new facility construction are pursued to improve safety and performance over the long-term.

5. **Identification of Safety Standards and Requirements.** *Before work is performed, the associated hazards shall be evaluated and an agreed-upon set of safety standards and requirements shall be established which, if properly implemented, will provide adequate assurance that the public, the workers, and the environment are protected from adverse consequences.*

Attributes:

- Facilities are designed, constructed, operated, maintained, and decommissioned using applicable consensus industry codes and standards, where available and applicable, to protect workers, the public, and the environment.

- Clear, concise technical safety directives that are centrally developed, where necessary, and are based on sound engineering judgment and data. DOE directives and technical standards are actively maintained up to date and accurate.

- A clearly-defined set of safety requirements and standards are invoked in management contracts, or similar agreements. An accepted process is used for identification of the appropriate set of requirements and standards. This set of requirements is comprehensive and includes stringent quality assurance, safety, and radiological and environmental protection requirements.

- Implementing plans, procedures and protocols are in place to effectively translate requirements into action by the implementing organization.

- Technical specifications clearly control the safe operating envelope. The safety envelope is clearly specified and communicated to individuals performing operational tasks.

- Exemptions from applicable technical requirements are rare, specific, short-term, provide equivalent safety, have a compelling technical basis, and are approved by a central technical authority.

- Compliance with applicable safety and technical requirements is expected and verified.

- Willful violations of requirements are rare, and personnel and organizations are held strictly accountable. Unintended violations of requirements are promptly reported, and personnel and organizations are given credit for self-identification and reporting of errors.

- The organization actively seeks to continuously improve safety standards and requirements through identification and sharing of effective practices, lessons learned, and applicable safety research. The organization is committed to continuously rising standards of excellence.

6. **Hazard Controls Tailored to Work Being Performed.** *Administrative and engineering controls to prevent and mitigate hazards shall be tailored to the work being performed and associated hazards.*

Attributes:

- Work hazards are controlled to prevent or mitigate accidents, with particular attention to low probability, high consequence events with unacceptable consequences.
- Safety analyses identifying work hazards are comprehensive and based on sound engineering judgment and data.
- Defense in depth is designed into highly-hazardous operations and activities, and include independent, redundant, and diverse safety systems, which are not overly complex. Defense in depth controls include engineering controls, administrative processes, and personnel staffing and capabilities.
- Emphasis is placed on designing the work and/or controls to reduce or eliminate the hazards and to prevent accidents and unplanned releases and exposures.
- A hierarchy of defense in depth is recognized and applied. Inherently safe designs are preferred over ones requiring engineering controls. Engineering safeguards are preferred over administrative controls. Administrative controls are preferred over personnel protective equipment.
- Equipment is meticulously maintained well within design requirements.
- Safety margins are rigorously maintained. Design and operating margins are carefully guarded and changed only with great thought and care. Special attention is placed on maintaining defense-in-depth.
- Organizations implement hazard controls in a consistent and reliable manner.
- Safety is embedded in processes and procedures through a functioning formal safety management system.
- Facility activities are governed by comprehensive, efficient, high-quality processes and procedures.
- Hazards are designed with an understanding of the potential for human error. Error-likely situations are identified, eliminated, or mitigated. Existence of known error-likely situations is communicated to workers prior to commencing work. Work is planned with consideration of error-likely situations.

7. **Operations Authorization.** *The conditions and requirements to be satisfied for operations to be initiated and conducted shall be clearly established and agreed upon.*

Attributes:

- Formal facility authorization agreements are in place and maintained between owner and operator.
- Readiness is verified before hazardous operations commence.
- Facility operations personnel maintain awareness of all facility activities to ensure compliance with the established safety envelope.
- Operations authorization is defined at the job and task level. The work authorization process verifies that adequate preparations have been completed so that work can be performed safely. These preparations include verifying that work methods and requirements are understood; verifying that work conditions will be as expected and not introduce unexpected hazards; and verifying that necessary controls are implemented.
- The extent of documentation and level of authority for agreement is based on the complexity and hazards associated with the work, and are clearly documented in the controlling ISM system description.

Supplemental High-Reliability Principles
for Effective Safety Management System Implementation

Based on experience and learning over the past 10 years since the inception of Integrated Safety Management, the Department has established the following four supplemental high-reliability principles to be used, along with the existing ISM guiding principles, to help develop the appropriate context or environment for effective implementation of Integrated Safety Management (ISM) systems within the Department of Energy and at its sites and facilities for 2005 and beyond:

A. **Highly-Reliable Operational Performance.** *Organizations achieve sustained, high levels of operational performance, encompassing all DOE and contractor activities to meet mission, safety, productivity, quality, environmental, and other objectives. High-reliability is achieved through a focus on operations, quality decision-making, open communications, deference to expertise, and systematic approaches to eliminate or mitigate error-likely situations.*

B. **Individual Attitude and Responsibility.** *Every individual accepts responsibility for safe mission performance. Individuals demonstrate a questioning attitude by challenging assumptions, investigating anomalies, and considering potential adverse consequences of planned actions. All employees are mindful of work conditions that may impact safety, and assist each other in preventing unsafe acts or behaviors.*

C. **Performance Assurance.** *Competent, robust, periodic and independent oversight is an essential source of feedback that verifies expectations are being met and identifies opportunities for improvement. Performance assurance activities verify whether standards and requirements are being met. Performance assurance through conscious, directed, independent reviews at all levels brings fresh insights and observations to be considered for safety and performance improvement.*

D. **Organizational Performance Improvement.** *The organization demonstrates excellence in performance monitoring, problem analysis, solution planning, and solution implementation. The organization encourages openness and trust, and cultivates a continuous learning environment.*

A. Highly-Reliable Operational Performance. *Organizations achieve sustained, high levels of operational performance, encompassing all DOE and contractor activities to meet mission, safety, productivity, quality, environmental, and other objectives. High-reliability is achieved through a focus on operations, quality decision-making, open communications, deference to expertise, and systematic approaches to eliminate or mitigate error-likely situations.*

Attributes:

- Leaders are in close contact with the front-line; leaders pay attention to real-time operational information. Maintaining operational awareness is a priority. Leaders identify critical performance elements and monitor these closely.

- Operational anomalies, even small ones, get prompt attention and evaluation – this allows early detection of problems so necessary action is taken before problems grow.

- People are systematic and rigorous in making decisions that support safe, reliable operations. Workers are expected and authorized to take conservative actions when faced with unexpected or uncertain conditions. Leaders support and reinforce conservative decisions.

- Candid dialogue and debate and a healthy skepticism are encouraged when safety issues are being evaluated. Differing professional opinions are welcomed and respected. Robust discussion and constructive conflict are recognized as a natural result of diversity of expertise and experience.

- Leaders regularly and promptly communicate important operational decisions, their basis, expected outcomes, potential problems, and planned contingencies.

- Organizations know the expertise of their personnel. Leadership and decision-making are delegated to qualified individuals with relevant expertise during operational upset conditions. People closest to the operational upset are empowered to make important decisions, and are held accountable justly.

- Operations personnel are held to high standards of both technical understanding and detailed task-oriented performance. Operations personnel provide reliable and consistent responses to expected occurrences. Flexible responses to unexpected occurrences are based on continuous preparation and training. Formality and discipline in operations is valued.

- Organizational systems and processes are designed to provide layers of defenses, recognizing that people are fallible. Error prevention and mitigation defenses are used to preclude errors from propagating. Error-likely situation are sought out and corrected, and recurrent errors are carefully examined as indicators of latent organizational weaknesses. Leaders aggressively and promptly correct latent organizational weaknesses and measure the effectiveness of actions taken to close the gaps.

B. Individual Attitude and Responsibility. *Every individual accepts responsibility for safe mission performance. Individuals demonstrate a questioning attitude by challenging assumptions, investigating anomalies, and considering potential adverse consequences of planned actions. All employees are mindful of work conditions that may impact safety, and assist each other in preventing unsafe acts or behaviors.*

Attributes:

- Individuals understand and demonstrate responsibility for safety. Safety and its ownership are apparent in everyone's actions and deeds. Workers are involved in job planning. Workers follow approved procedures. Workers at any level can stop unsafe work or work during unexpected conditions.

- Workers are actively involved in identification, planning and improvement of work and work practices.

- People promptly report errors and incidents. People feel safe from reprisal in reporting errors and incidents; people offer suggestions for improvement and innovative solutions.

- People are mindful of the possibility and potential impact of process and equipment failures; people are sensitive to the potential of faulty assumptions and errors, and demonstrate constructive skepticism. People appreciate that mindfulness requires effort.

- People recognize that errors and imperfections are likely to happen. They recognize the limits of foresight and anticipation, and watch for things that have not been seen before. People appreciate that error-likely situations are predictable, manageable, and preventable, and seek to identify and eliminate latent conditions that give rise to human performance errors.

- Individuals cultivate a constructive, questioning attitude and healthy skepticism when it comes to safety. Team members support one another through both awareness of each other's actions and constructive feedback when necessary.

- Individuals are aware of and counteract human tendencies to simplify assumptions, expectations, and analysis. Diversity of thought and opposing views are welcomed and considered. Intellectual curiosity is encouraged.

- Individuals are intolerant of conditions or behaviors that have the potential to reduce operating or design margins. Anomalies are thoroughly investigated, promptly mitigated, and periodically analyzed in the aggregate. The bias is set on proving work activities are safe before proceeding, rather than proving them unsafe before halting. Personnel do not proceed when safety is uncertain.

- Individuals question deviances, and avoid institutional complacency or arrogance based on past successes. Individuals are attentive to indications of organizational arrogance, overconfidence, narrowed perception, or false optimism.

C. Performance Assurance. *Competent, robust, periodic and independent oversight is an essential source of feedback that verifies expectations are being met and identifies opportunities for improvement. Performance assurance activities verify whether standards and requirements are being met. Performance assurance through conscious, directed, independent reviews at all levels brings fresh insights and observations to be considered for safety and performance improvement.*

Attributes:

- Performance assurance consists of robust, frequent, and independent oversight, conducted at all levels of the organization. Performance assurance includes independent evaluation of performance indicators and trend analysis.

- Performance assurance programs are guided by plans that ensure a base level of relevant areas are reviewed. Assessments are performed to established requirements (or Criteria and Review Approach Documents).

- Efficient redundancy in monitoring is valued; higher levels of redundancy are recognized as necessary for higher risk activities.

- Performance Assurance includes a diversity of independent "fresh looks" to ensure completeness and to avoid complacency. A mix of internal and external oversight reviews reflects an integrated and balanced approach. This balance is periodically reviewed and adjusted as needed.

- The insights and fresh perspectives provided by performance assurance personnel are valued. Organizational feedback is actively sought to make performance assurance activities more value-added.

- Complete, accurate, and forthright information is provided to performance assurance organizations.

- Findings from performance assurance activities are effectively integrated into the performance improvement processes, such that they receive adequate and timely attention. Linkages with other performance monitoring inputs are examined, high-quality causal analyses are conducted, as needed, and corrective actions are tracked to closure with effectiveness verified to prevent future occurrences.

- Leaders throughout the organization set an example for safety through their direct involvement in oversight activities and associated performance improvement.

- Senior executives are periodically briefed on results of oversight group activities to gain insight into organizational performance and to direct needed corrective actions.

- Periodic ISM assessments are conducted and used as a basis for ISM program adjustments and implementation improvements.

D. Organizational Performance Improvement. *The organization demonstrates excellence in performance monitoring, problem analysis, solution planning, and solution implementation. The organization encourages openness and trust, and cultivates a continuous learning environment.*

Attributes:

- The organization actively and systematically monitors performance through multiple means, including leader walk-arounds, issue reporting, performance indicators, trend analysis, benchmarking, industry experience reviews, self-assessments, and performance assessments. Feedback from various means is integrated to create a full understanding.

- Processes are established to identify and resolve latent organizational weaknesses that can aggravate relatively minor events if not corrected. Linkages among problems and organizational issues are examined and communicated.

- Open communications and teamwork are the norm. People are comfortable raising and discussing questions or concerns. No news is bad news. All information is valued, because it shows that the organization is effectively self-monitoring.

- A high level of trust is established in the organization. Reporting of individual errors is encouraged and valued. A variety of methods are available for personnel to raise safety issues, without fear of retribution.

- Organization members convene to swiftly uncover lessons and learn from mistakes. Frequent incident reviews are conducted promptly after an incident to ensure data quality to identify improvement opportunities.

- Operating experience is highly valued, and the capacity to learn from experience is well developed. The organization regularly examines and learns from operating experiences, both internal and in related industries.

- Expertise in causal analysis is applied effectively to examine events and improve safety focus. High-quality causal analysis is the norm. Causal analysis is performed on a graded approach for both major and minor incidents. Any failure, no matter how small, is viewed as a window into the system that can spur learning.

- Performance improvement processes encourage workers to offer innovative ideas to improve performance and to solve problems.

- Leaders are actively involved in all phases of performance monitoring, problem analysis, solution planning, and solution implementation to resolve safety issues.

- Vigorous corrective and improvement action programs are in place and effective. Rapid response to problems and closeout of issues ensures that small issues do not become large ones. Managers are actively involved to balance priorities to achieve timely resolutions.

Implementation

Implementation of this vision is described in the Department's 2004-1 implementation plan to improve oversight of nuclear operations. Initially, DOE offices will be expected to prepare ISM system descriptions that address how these principles will be implemented to create the desired behaviors for effective ISM implementation. It is expected that some DOE contractors seeking excellence will find it beneficial to adopt all or part of this approach, and begin gaining experience and improved performance. Ultimately, DOE directives will be revised to capture the experience, lessons learned, successful implementation methods, and good practices related to implementation.

Conclusion

Thorough and consistent implementation of the principles in this document will provide the necessary environment for DOE organizations to succeed and thrive. These principles provide the vision for DOE to become a high-performing organization, with an excellent safety record and an excellent productivity record. These principles capture the elements needed for DOE to move beyond a compliance-based approach to a performance-based approach, consistent with more mature high-reliability organizations.

For example, the International Atomic Energy Agency (IAEA) developed a capability maturity model that illustrates the stages that an organization goes though in achieving a mature safety culture. These stages are:

> *Stage I.* The organization sees safety as an external requirement and not as an aspect of conduct that will help the organization to succeed. The external requirements are those of national governments, regional authorities, or regulatory bodies. There is little awareness of behavioral and attitudinal aspects of safety performance, and no willingness to consider such issues. Safety is seen very much as a technical issue. Mere compliance with rules and regulations is considered adequate.
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> *Stage II.* An organization at Stage II has a management which perceives safety performance as important even in the absence of regulatory pressure. Although there is growing awareness of behavioral issues, this aspect is largely missing from safety management methods which comprise technical and procedural solutions. Safety performance is dealt with, along with other aspects of the business, in terms of targets or goals. The organization begins to look at the reasons why safety performance reaches a plateau and is willing to seek the advice of other organizations.
>
> *Stage III.* An organization at Stage III has adopted the idea of continuous improvement and applied the concept to safety performance. There is a strong emphasis on communications, training, management style, and improving efficiency and effectiveness. Everyone in the organization can contribute. Some behaviors are seen within the organization which enables improvements to take place and, on the other hand, there are behaviors which act as a barrier to further improvement. Consequently, people also understand the impact of behavioral issues on safety. The level of awareness of behavioral and attitudinal issues is high, and measures are being taken to improve behavior. Progress is made one step at a time and never stops. The organization asks how it might help other companies.

The principles described herein can take the Department to IAEA Stage III performance, a fully developed safety culture.

Appendix G: DOE Expectations for Implementation of ISM at DOE Offices

DOE Expectations for Implementation of ISM at DOE Offices

DRAFT

ISM Expectations for DOE HQ Program Offices (NA, EM, NE, SC, EH, OA)

1. ISM System Descriptions – As part of the ISM core function to "Define Work Scope," DOE HQ program offices will create and maintain ISM system descriptions that are accurate and up-to-date. ISM system descriptions for DOE program offices will be approved by the responsible DOE headquarters program office. These systems descriptions will describe how the program offices define their work activities related to achieving the ISM objective, as defined in DOE Policy 450.4, *Safety Management System Policy*. These system descriptions will describe the ISM mechanisms, processes and methods by which the program office implements the five ISM core functions. These system descriptions will describe the processes and methods used to create an effective environment for ISM implementation, as defined by the seven ISM guiding principles and four supplemental high-reliability principles (articulated in the 2004-1 Implementation Plan). These system descriptions will describe how the program office will measure ISM effectiveness, perform annual reviews of ISM effectiveness, and prepare annual ISM declarations. These system descriptions will also establish, document, and implement relevant safety performance objectives, performance measures, and commitments in response to program and budget execution guidance while maintaining the integrity of the system. ISM system descriptions will be updated at least annually, as needed.

These ISM system descriptions will follow applicable DOE guidance, including that found in DOE Guide 450.4, *Integrated Safety Management System Guide.* These ISM system descriptions are the controlling management system descriptions for the program office and must be integrated with the Quality Assurance Program (see existing requirement in DOE Order 414.1C, *Quality Assurance*). These systems will be integrated with the office business processes for work definition and planning, budgeting, authorization, execution, change control, performance measurement, and performance evaluation. These ISM system descriptions may be integrated into a single document with the program Functions, Responsibilities and Authorities document, which must be consistent with the ISM system descriptions.

2. Annual Effectiveness Reviews of ISM Implementation – As part of the ISM core function of "Feedback and Improvement," DOE HQ program offices will perform annual

self-assessment reviews of ISM implementation at the program office level. DOE HQ program offices will also perform line-oversight reviews of their site offices' implementation of ISM, including an integrated review of the site level annual ISM reviews and declarations by both federal and contractor organizations.

3. Annual ISM Declarations – As part of the ISM core function of "Feedback and Improvement," DOE HQ program offices will annually declare in writing whether ISM is effectively implemented within that program office. If not, corrective or compensatory actions will be defined, tracked, and verified. Annual ISM declarations should provide a detailed basis which includes the annual ISM review, lower-level ISM reviews, and pertinent feedback data from a variety of mechanisms. Areas for improving ISM implementation performance will be clearly identified to promote continuous improvement. Annual ISM declarations should be provided to the DOE senior official above the program office (EH will declare to the DS; NA will declare to NA-1; EM, NE, and SC will declare to US-ESE; OA will declare to the Secretary concerning the status of implementation of ISM in the total DOE complex).

4. Annual Performance Expectations and Performance Objectives – As part of the ISM core function of "Feedback and Improvement," DOE HQ program offices will annually prepare safety performance objectives, performance measures, and commitments, for approval by the DOE senior official above the program office (DS will approve EH's, NA-1 will approve NA's, US-ESE will approve those for EM, NE and SC, etc.).

ISM Expectations for DOE Field Offices

1. ISM System Descriptions – As part of the ISM core function to "Define Work Scope," DOE field offices (including NNSA site offices and EM project offices) will create and maintain approved ISM system descriptions that are accurate and up-to-date. ISM system descriptions for DOE field offices will be submitted for review and approval by the responsible program office. These systems descriptions will describe how the field offices define their work activities related to achieving the ISM objective, as defined in DOE Policy 450.4, *Safety Management System Policy*. These system descriptions will describe the processes and methods by which the field office implements the five ISM core functions. These system descriptions will describe the ISM mechanisms, processes and methods used to create an effective environment for ISM implementation, as defined by the seven ISM guiding principles and four supplemental high-reliability principles (articulated in the 2004-1 Implementation Plan). These system descriptions will describe how the field office will measure ISM effectiveness, perform annual reviews of ISM effectiveness, and prepare annual ISM declarations. These system descriptions will also establish, document, and implement relevant safety performance objectives, performance measures, and commitments in response to program and budget execution guidance while maintaining the integrity of the system. ISM system descriptions will be updated at least annually, as needed.

These ISM system descriptions will follow applicable DOE guidance, including that found in DOE Guide 450.4, *Integrated Safety Management System Guide.* These ISM system descriptions are the controlling management system descriptions for the field office and must be integrated with the Quality Assurance Program (see existing requirement in DOE Order 414.1C, *Quality Assurance*). These systems need to be integrated with the office's business processes for work definition and planning, budgeting, authorization, execution, change control, performance measurement, and performance evaluation. These ISM system descriptions may be integrated into a single document with the program Functions, Responsibilities and Authorities document, which must be consistent with the ISM system descriptions.

2. Annual Effectiveness Reviews of ISM Implementation – As part of the ISM core function of "Feedback and Improvement," DOE field offices will perform annual self-assessment reviews of ISM implementation at the field office level. DOE field program offices will also perform line-oversight reviews of their contractor implementation of ISM, including an integrated review of contractor annual ISM reviews and declarations, if the office has more than one contractor.

3. Annual ISM Declarations – As part of the ISM core function of "Feedback and Improvement," DOE field offices will annually declare in writing whether ISM is effectively implemented within that field office. If not, corrective or compensatory actions will be defined, tracked, and verified. Areas for improving ISM implementation performance will be clearly identified to promote continuous improvement. Annual ISM declarations should provide a detailed basis which includes the annual ISM review, lower-level ISM reviews, and pertinent feedback data from a variety of mechanisms. Annual ISM declarations should be provided to the responsible HQ program office for review.

4. Annual Performance Expectations and Performance Objectives – As part of the ISM core function of "Feedback and Improvement," DOE field offices will annually prepare safety performance objectives, performance measures, and commitments, for approval by the HQ program office.

ISM Expectations for Review of DOE HQ Program Offices

1. Line Oversight – DOE Central Technical Authorities (CTAs) will review Annual ISM reviews, declarations, and performance objectives for their line organizations, for both headquarters line organizations and for field offices.

2. Independent Oversight – DOE OA will perform periodic independent oversight of ISM implementation at all levels (i.e., DOE headquarters program offices, DOE field offices, and DOE contractors).

Schedule

1. ISM Workshop on ISM System Descriptions (by the end of August 2005)

2. Issue template for ISM system descriptions for Headquarters programs (by October 2005).

3. Issue draft ISM system descriptions for Headquarters programs (by January 2006).

4. Issue approved ISM system descriptions for Headquarters programs (by March 2006).

5. Issue draft ISM system descriptions for field offices (by May 2006).

6. Issue approved ISM system descriptions for field offices (by August 2006).

7. Complete first annual ISM reviews within 1 year of approval of ISM system descriptions (by August 2007)

8. Complete first annual ISM Declarations within 1 year of approval of ISM system descriptions (by August 2007)

9. Complete preparation and approval of first set of annual ISM performance objectives within 1 year of approval of ISM system description (by August 2007)